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THE FARMER'S MAGAZINE.

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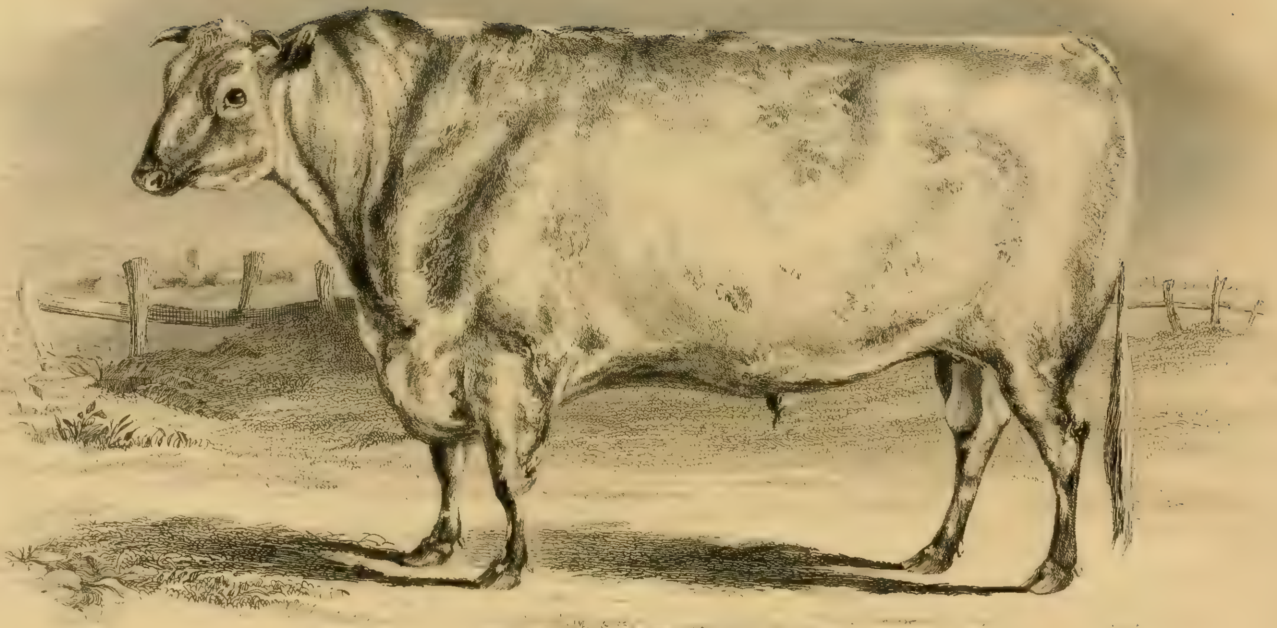

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THE FARMER'S MAGAZINE.

JULY, 1846.

No. 1.—Vol. XIV.] [Second Series.

PLATE I.

PORTRAIT OF JOHN GREY, ESQ.,

OF DILSTON, NORTHUMBERLAND.

ENGRAVED BY J. B. HUNT, FROM A PAINTING BY J. CARRICK.

PLATE II.

CRAMER; A SHORT-HORN BULL.

Roan, calved November 6, 1842, bred by John Parkinson, Esq., Ley Fields; the property of James Bankes Stanhope, Esq., Revesby Abbey, near Boston; got by Sir Thomas Fairfax (5196), d. (Cassandra) by Miracle (2320), g. d. (Garland) by Matchem (2281), gr. g. d. by Fitz Remus (2025), gr. gr. g. d. by Cato (119), gr. gr. gr. g. d. by Whitworth (695), gr. gr. gr. gr. g. d. bought by Mr. Shaftoe of Mr. Mason, Chilton, Durham.

Cramer won the first prize for the best Bull Calf at the Doncaster Meeting of the Yorkshire Society, in 1843; and the first prize of Thirty Sovereigns for the best Bull of any age, at the Shrewsbury Meeting of the Royal Agricultural Society of England, in 1845. By reference to the above pedigree, it will be seen that this animal was got by Sir Thomas Fairfax (the first prize Bull at Bristol in 1842) out of the celebrated Cow Cassandra, the dam of Clementi and Collard.

JOHN GREY, ESQ.,

OF DILSTON, NORTHUMBERLAND.

There are few professions of late years which have profited more from a general association of the members engaged on it than that of agriculture. From time immemorial the idea of bringing the whole body together, and letting the experienced speak and the young listen, the more talented teach and the less so learn, has been amongst the first and most natural plans devised for advancing art and science of every description. With none, moreover, from the very first glance we give to such a means, could there be more apparent necessity for this gathering, or greater promise of good arising from it, than when adopted by the sons of the soil. If the profound calculator, whose problems and puzzles would work out as well and as truly in one country as another, must yet have his house of assembly to test them at; if the poet—even *nascitur non fit*—still requires the companionship of his brethren to polish and round off his numbers; or, sinking a little lower, if trade and mechanism of every degree has its band and body to regulate and improve it by, surely the comparatively retired occupation of the farmer should have some as highly acknowledged and as easily accessible sources of communication. But for this union of strength, the happy accident or experiment of one working man could benefit alone the land it occurred on; the long and closely applied observation of another but endure for the threescore and ten employed in proving it; and the advancement of any one favoured locality continue without a chance of imparting or collating its improvement with others. *With* it, on the other hand, there came a general hope of, and an individual desire for progressing, that, we repeat, the results of the last few years have done much towards realizing. The tenant can now go on with a consciousness that there are those who can sympathize with and instruct him; while men who have had the opportunity of "cultivating the mind as well as the land," who have made the country their home, and its duties their pleasures, have proffered their services with a heartiness that has almost ever been proportionate with their ability. North, south, east, and west have already sent in their representatives on these terms; members whose lives have been spent in close observation of the districts they have resided in, and who have brought to bear on their researches the feeling of the gentleman, and the ardour of the enthusiast, with the practical consideration of the man of business.

Of all the four points we have named—north, south, east, or west—none is or has been for some time regarded with more interest by the whole body of British farmers than the north. The admirable style of cultivation in practice there, the good understanding between landlord and tenant, and the proverbial prosperity of the latter, had long been themes rumoured to the Southron, though without for many a day being explicitly entered into. That a few of the grand features of Northern agriculture had extended to what some might call more favourable parts, we are far from disposed to dispute; but until the general association alluded to first gave the opportunity, no thorough exposition to the working of the system had been offered. It was then that Lord Spencer, in calling on a representative of that system for an illustration of it, hit on one of the greatest reciprocal advantages the society has diffused; it was thus the south obtained full information as to the best principles of northern agriculture, and from this starting paper that all the great farming districts of the United Kingdom are and have been comparing their methods and customs one with the other. The author of this said paper, as we shall now proceed to show and prove, so well worthy of place amongst EMINENT BRITISH FARMERS, is Mr. John Grey, of Dilston, to whom, in any agricultural house we might choose to assemble, we should at once award the seat for Northumberland; and who, as we have already said, would join with other weighty recommendations the education of the gentleman, the ardour of the enthusiast, and the practical experience of the man of business.

Mr. Grey, a name famous in that county, is a native of, and almost constant resident in the county whose advancement he has so generally assisted in, and so ably chronicled. He was born in Glendale, one of the best cultivated parts of Northumberland, and on the farm of Milfield Hill, which has been held on from father to son for the last seventy years—a fact of itself that should go far to establish the good intent and equally well-doing of the occupant. To the hill, however, even in so forward a province as Glendale, we must not limit Mr. Grey's exertion as a practical farmer; for, in addition to "the Home Farm," he held nine hundred acres under Lord Grey, with other lands on tenancy, and an estate of his own at West Ord, on the banks of the Tweed, and in the immediate neighbourhood of Berwick. The whole extent of Northumberland's picked country thus farmed by the subject of our notice reached something very like three thousand acres, and all who have ever been over it will bear us out in saying that, despite its magnitude, not one acre or headland was observable, but to which every possible justice had been done. Glendale has, in fact, long been one of the model farms of a model county, where many experiments in the Scotch system of husbandry have been first tried, more still further improved on, and the true merits of all established. "In no country, perhaps," to use Mr. Grey's own words, "has the cultivation of turnips added in an equal degree to the produce of the land as in this (Northumberland):" and with such a declaration before us, we need scarcely add that the turnip crop at Milfield Hill has long been both in quantity and quality about the first in a quarter so pre-eminently dependent upon its proper growth. In sheep and cattle the Milfield Hill produce has been equally looked for, Mr. Grey annually letting from his large flocks a number of Leicester rams; while the prize-list for this kind of sheep and the shorthorn breed of cattle has ever been ready with ample testimony to the care and judgment exercised by Mr. Grey in this department of the farmer's duties. In a word, he has pursued the science of agriculture with all the unremitting labour and attention of the tenant farmer, at the same time that he has allowed himself every opportunity for making those trials the mere amateur might perhaps more eagerly and exclusively engage himself on. An arduous combination of character which affords about the best proof of its being successfully sustained, while the tenant continues a profit that the experimentalist does not materially decrease. With Mr. Grey, however, we think we may in justice go farther than this, and declare him as having, hand in hand and step for step, advanced his own interest with that of agriculture in general.

As a British farmer, and as an eminent one, we could require little beyond the evidence thus adduced to admit for Mr. Grey that experience to speak and talent to teach which would be expected from a leader in the assembly. Still his own threshold has perhaps not, after all, been the scene of his greatest efforts and triumphs, although the home practice, of course, furnished the main-spring to that public duty he was so judiciously selected to undertake. In the year 1832, retrenchment and revision being the grand order of the day, it was determined, amongst other subjects for amendment, to introduce an entire change in the management of the extensive estates connected with Greenwich Hospital. This property—situated in different parts of the county of Northumberland, from the source of the Tyne to the mouth of the Tweed, and including a large tract of lead-mining on Alston Moor, and coal-mines in several other districts—was, originally, in the possession of the Derwentwater family, whose residence was at Dilston, still the head-quarters of the estate. The last Earl of Derwentwater, unhappily, took a prominent part in the rebellion of 1715, for which he ultimately suffered on the scaffold; the whole of his property being, as the possessions of a rebel, of course confiscated to the Crown. With it the government, as we have said, endowed that national and much-needed institution, Greenwich Hospital; and with the management of it, in 1832, attempted a change for the better in its regulations. The expenses of the establishment were altogether and signally reduced—the more particularly as regarded the number of officials employed; and in accordance with this feature in the revisal, Mr. Grey, on the recommendation of Earl Grey (the then Premier), and Lord Althorp (the Chancellor of the Exchequer), was appointed sole receiver and manager, in place of two previously in power. The excellence of this selection has been fully proved by the manner in which the property has been since worked and attended to; Mr. Grey's intimate knowledge of the people, and the customs of the country it is situated in, together with the high character we have shown he already enjoyed as an agriculturist, giving him an advantage in assuming the direction, that a thorough aptitude for the more business-like parts of the office has gradually confirmed. Long leases, liberal covenants, extensive and thorough draining, with other items just now becoming so generally known as "TENANT RIGHTS" have, all through his long and onerous responsibility, been the chief heads of his system of arrangement between his neighbours and his country. A system so fertile in mutual good, and conducive to so great and apparent improvement to both the farmer and the farm, as to have been more than once publicly acknowledged in the House of Commons. His value, indeed, as an authority on all subjects connected with rural economy, is now well known by the Legislature, and he is consequently often called on to give his opinions and experience before parliamentary committees.

Amongst other points to which his answers have been directed, we may more especially refer to the evidence on the Enclosure of Commons, and that relating to the Condition of the Labouring Population. Touching the latter, his testimony is more than usually worthy of perusal and attention, from the evident earnestness and pride with which he refers to the life and character of the farm-labourer in his own country:—"In contrasting the condition of the peasantry in the southern with that of the northern parts of the kingdom, it would be highly improper to pass over unnoticed the superior education of the latter, and the effect which is produced by it upon their worldly circumstances, as well as upon their moral and religious character. No greater stigma can attach to parents than that of leaving their children without the means of ordinary education; and every nerve is strained to procure it. Even the young men who labour in the fields all the day, often spend a couple of hours in the evening in school, to advance themselves in fit acquirements. If occupation alone is a valuable antidote against idle and vicious habits, the acquirement of useful knowledge and the cultivation of the mental faculties must be more so. And when these are prosecuted—not by gratuitous means, but by the produce of economy and toil—it bespeaks a state of society where sobriety is habitual, and intelligence is held in estimation."

All honour, then, say we, from one and all—from high and low, to John Grey, of Dilston; who writes down the record of his brother farmers' success for the benefit of the world, and tells, face to face, in the councils of his country, the truth of heart and independence of principle that mark the poor farm-labourer, "where sobriety is habitual, and intelligence esteemed"!

As a public writer, as well as a *vivâ voce* champion of agriculture and her rights, we have more than once, in the course of this sketch, hinted at Mr. Grey's very signal success. Still the many other calls on his talents have not allowed him so frequent an exercise of them in literary composition as might have been desired; and an occasional contribution to some one of the different periodicals devoted to agriculture would appear to have pretty well occupied the little leisure of our author up to the year 1841. It was then that—in compliance with the wishes of many eminent agriculturists, including Lord Spencer, the President of the Society—Mr. Grey prepared his "Review of Northern Agriculture" for the *Journal of the Royal Agricultural Society of England*, and published it in the second volume of those records. To say that the treatise fully realized everything expected from it, would be but faint praise: like the birth-place of its writer, it stands in every respect as a model for others; and, as such, was at once received by the distinguished Society to whom it was presented. "The Past and Present State of Agriculture in the different Counties," now going through the pages of the *Journal*, are, and have ever since been, made up to those good points and features Mr. Grey imposed on himself in penning the first. A brief review of the past—a summary rather of how the peculiar usages of the shire came so—and a clear and close description of how they now work, are the texts which the candidate for the Prize Essay must strive to associate with an easiness, but yet a carefulness of style, that may encourage while it instructs. With his own power and experience, in fact, he must borrow a little of Mr. Grey's tact, and sit down—as we would urge every farmer's friend who takes to pen and ink—to write well without trying to write fine.

The following taste of this style, embodying as it does, principles that Mr. Grey himself has laboured so strenuously to advance, may not come altogether out of place here:—"The grand desideratum, however, of basing the practice of agriculture upon scientific principles, it must be confessed, has as yet made but small progress. To effect that important end, the culture of the mind must precede that of the land; and, although the farmers of the district now under review, holding large tracts of land, and possessed of great capital, have received a more liberal education, and are more distinguished for intelligence and information than many others, yet the daily occupations of the practical farmer, as such, are in no way favourable to scientific research and intellectual attainment. We must look to other quarters for the consummation of this great object; and happily a new era is opening upon us, and brighter prospects are rising to our view; the great and influential of the land have engaged themselves in the work. This most important branch of our national industry, and source of our national prosperity, is no longer to be left for its advancement to the chance directed discoveries of the unlettered rustic."

Having thus endeavoured, by a plain statement of facts, to do justice to Mr. Grey—as equally good in practice, print, and office—we may conclude with a few words as to his character as a neighbour and a country gentleman. On the banks of the Tweed Mr. Grey was known as an active magistrate, and though he has now withdrawn from such duties, we find him earnestly devoting his leisure time to promote the interests of agriculture, and the good of the district in which he lives. He was the originator of the Tyneside Agricultural Society, now grown to some eminence; is the President of the Hexham Farmer's Club;* a Commissioner of Taxes, and a zealous advocate for improvement as a trustee of several lines of turnpike. All this proves the unceasing activity and ability of the man: an energy and industry that in any situation must, eventually, have established that private worth which works on—either directly or indirectly, but still so surely—to public good. From the severer, or, perhaps more properly, the daily duties of an agricultural life, Mr. Grey, we are told, has now nearly retired; the Milfield Hill and other farms are still, however, carried on by his son, and in a manner altogether in accordance with that which has hitherto succeeded so well. In gaining the good opinion of his neighbours individually, and that of the agricultural associations collectively—as witness the award list, for the last three or four years, of the Highland and Irish societies—Mr. Grey, jun., has proved in every way worthy of his descent, and promises to hand down the family name with that credit and renown which is, and long has been, so deservedly attached to it.

THE TIMES OF THOMAS TUSSER.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

My attention was recently again directed to the works of Thomas Tusser, by a small pamphlet, printed with his accustomed neatness, for private circulation, by Mr. Charles Clark, an extensive, practical farmer, at his own private press in Great Totham, a rural parish, situated two or three miles only from Rivenhall—Tusser's birth-place.

This quarto tract is entitled "The last Will and Testament of Thomas Tusser, author of 'Five Hundred Points of Good Husbandry,' &c., now first printed; to which is added his metrical autobiography, &c."

---

* Mr. Grey's "Address on the subject of thorough draining," delivered on the 9th June, will be given in the next number of the Farmer's Magazine.

Tusser lived in a period which is peculiarly interesting to the accomplished English farmer; born at Rivenhall in Essex, in 1515; it is supposed that he died in London, about the year 1580—a supposition, which the date of his will certainly, to some extent, confirms. It describes him as being then, "feeble in body." It is witnessed amongst others by Francis Shackleton, the minister of St. Mildreds, in the Poultry; and it was in this church, according to Stowe, that he was buried with an epitaph commencing—

"Here Thomas Tusser, clad in earth, doth lie,
That sometime made the pointes of husbandry."*

These sixty-five years to which his life extended is remarkable as being the period when the first great efforts were made to promote the cultivation of England's soils, and to increase the then meager list of her cultivated vegetables and field crops. It was only when Tusser was a boy that even cabbages began to be cultivated in England, he was six years old before either rose bushes or mulberry trees were known in this country. It required eleven years more to introduce the strawberry, another eight years for the the arrival of the cucumber. He was thirty-five years of age before the apricot was first transplanted from Epirus into England; and the gooseberry and the carrot was introduced to the notice of the English gardeners. Tusser was nearly fifty years of age before the potato was brought from America; and, like all agricultural novelties, their early progress was very tardy. He had been many years in his grave before they were generally cultivated, and it was more than a century after his decease before turnips began to be generally known in England as a field crop.

These things should be remembered by the reader of Tusser's works; for they will serve to explain many things which Tusser states as the ordinary practices of the farmers of his age. The reason, for instance, why they killed their cattle as winter approached (for they had no winter green food to keep them upon),and why salted meat, and salt fish then formed so large a portion of the ordinary diet of an English yeoman. His works abound with many interesting notices of the customs, habits, and manners of the farmers of the reigns of the sovereigns of the House of Tudor. And, if Tusser was not the very first English author who ever wrote upon agriculture, he was only preceded by Sir A. Fitzherbert; and he was certainly the first English practical farmer who ever published anything descriptive of the science he followed.

The village of Rivenhall, situated between the towns of Witham, and Kelvedon, in Essex, was the birth-place of Thomas Tusser. It is here that our friend Henry Dixon now carries on his researches for the improvement of the draining tiles and pipes of the modern farmer; and when the inquiring agriculturist now makes a pilgrimage to Rivenhall, if he does not discover any traces of Tusser, he will find, in these pipe works, and in the highly cultivated adjoining farms more than one object, which may enable him to combine in his tour both instruction and amusement.

So little is known of the personal history of Tusser, that any addition to the imperfect outline which can be gleaned from his own works is valuable; and I therefore deem no apology necessary to Mr. Clarke for transferring to the pages of this magazine the copy of Tusser's will, which has, through his exertions, been rescued from oblivion.

"THE LAST WILL OF THOMAS TUSSER.

"IN THE NAME OF GOD, AMEN. The XXV. of April, 1580, I, THOMAS TUSSER, of Chesterton, in the Countye of Cambridge, Gent., being feeble in bodye, but perfecte in memorie, thanks be to God, doe make and ordaine this my last Will and Testament in manner and forme followinge, revokinge all other wills heretofore made, That is to saye, Ffirst and principallye, I give and betake my sowle to Allmightie God the Father (my Maker), and to his Son Jesus Christ (my onelye Redeemer), by whose merits I most firmelye beleve and trust to be saved, and to be partaker of lyef everlastinge, and to the Holye Gost (my Comforter), three personnes in one everlastinge Godheade, whome I doe most humblye thanke that he hathe mercifully kept me untill this tyme, and that he hathe given tyme and space to confess and bewaile my sinnes, and that he hath forgiven me them all, thorough the merites of our Saviour Jesus Christ, which I doe undoubtedlye beleve, because he hath mercifully promised yt, to whom be praise for ever and ever, Amen.

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* Tusser came of a respectable and well allied family. He says of himself—

It came to pass, that born I was,
Of lineage good, of gentle blood,
In Essex layer, in village fair,
That Rivenhall hight;
Which village lied by Banktree side;
There spend did I mine infancy,
There then my name, in honest fame,
Remain'd in sight.

His family had property at Rivenhall; Clement Tusser, in 1560, presented a clerk to the parish (2, Newcourt, p. 494). "In this parish," says Morant, writing in 1768 (Hist. of Essex, v. 2, p. 149), "was formerly settled a family surnamed Tusser, William Tusser married Isabella, daughter of Thomas Smyth, of this place, sister to Sir Clement Smyth; and had by her five sons and three daughters. From one of the sons sprung Thomas Tusser, author of 'Five Hundred Points of Good Husbandry,'" &c.

Item. I give and bequeathe unto Thomas Tusser, my eldest Sonne, to be delivered unto him within one yere next after my decease, Ffyftye Pounds of good and lawful monye of England, parcell of the Three Hundrethe and Thirtie Pownds which William Tusser, my Brother, dothe owe unto me uppon one recognisaunce wherein he standethe bownde unto me for the true paiment thereof; and my will is, That suche trustye Frend, or Frends, as shall be hereafter in this my last Will and Testament named, shall have the said Fiftie Pounds for and duringe the nonage of my said Sonne Thomas, and untill such time as he shall accomplishe and come to the Age of XX and One Yeres, puttinge in sufficient suerties for the true paiment thereof unto the said Thomas my Sonne; and alsoe to paye for and towards the bringinge up of my said Sonne Thomas, yerelye, the summe of Fyve Pownds, untill he shall accomplish and come to the Age of Twenty and One Yeres; and when my said Sonne Thomas shall accomplishe his said Age of Twentye and One Yeres, I will that the said sum of Fyftye Pownds shalbe, within one monethe next ensueing after the said accomplishment of Twentye and One Yeres, unto him well and trulye contented and paid at one whole and entire paiment, &c.

THOMAS TUSSER.

Item. I give unto John Tusser, my second Sonne, other Fyftie Pownds of lawfull monye of England, due unto me by the foresaid recognisance, and to be bestowed and employed to his use duringe his minoritie, and likewise to be paid unto him in suche and as lardge manner and forme to all constructions and purposes as is before declared of the other Fyftie Pownds before devised unto my Sonne Thomas Tusser; and also Fyve Pownds to be paid yerely, duringe his minoritie, in manner and forme before rehersed.

THOMAS TUSSER.

Item. I give and bequeathe unto Edmond Tusser, my Sonne, and to Marye Tusser, my Daughter, and unto either of them, the summe of Fyftye Pownds, due to be by force of the foresaid recognisaunce, and to be bestowed and employed to the severall uses and benefitts of them, and either of them, during their minorities, and likewise to be paid to either of them in suche and as lardge manner and forme in everie respecte, to all constructions and purposes, as is before declared of the Fyftye Pownds devised before to my Sonne Thomas Tusser; and also Fyve Pownds a piece yerelye, duringe their minorities, in manner and forme before rehersed. THOMAS TUSSER.

Item. I give and bequeathe unto Amy Tusser, my Wyef, the summe of Foure Score Pownds of lawful monye of England, dewe to me by force of the said recognisaunce, and to be paid unto her within one wholl yere next ensewinge after my decease. THOMAS TUSSER.

Item. My will and intent is, That yf my Brother, William Tusser, doe accordinge unto the intent and true meaninge of this my last Will and Testament, well and trulye paye the foresaid severall summes of monye, before geven and bequeathed, unto Amye, my Wyef, to Thomas, my Sonne, and to the rest of my Children before named, and alsoe doe from tyme to tyme, and at all times hereafter, save and kepe harmeles my Heires, Executors, and Administrators, and everie of them, of and from all trobles, charges, and excumbrances, which maye at anye tyme hereafter come, rise, or growe, for or by reason of anye manner of Bonds wherein I stande bounde for or with him as suertie. That then I give and bequeathe unto him the summe of Fyftie Pownds, beinge the residwe of the said summe due unto me by the force of the said recognisaunce before rehersed; and yf he doe not well and trulye performe the same, then I give the said Fiftie Pownds unto my Executor of this my last Will and Testament. THOMAS TUSSER.

Item. I will that yf anye of my Children dye before they come to and accomplishe theire foresaid severall ages of XXI Yeres, that then I will that his or theire parts or portions shalbe distributed and equallye divided to and amongst the rest of my other children then survyveinge.

THOMAS TUSSER.

Item. I give and bequeathe unto the afore-named Thomas Tusser, my Sonne, and his Heires, all those Seven Acres and a Roode of Copy holde which I now have lyinge in the Parish or Feilds of Chesterton; to have and to hold the same, after the deathe of Amye, my Wyef, to him, his Heires, and Assignes, for ever. THOMAS TUSSER.

Item. I give also to the said Thomas Tusser, my Sonne, all suche Estate and Tearme of Yeares as I have yet to come in a certaine Close called Lawyer's Close, lyeing and beinge in the Parish of Chesterton, which said Close I have demised unto one William Mosse, for the tearme of one whole Yere, begininge at the Feast of St. Gregorye last past, yeldinge and payeinge for the same XXXV*s.* Rente, which said Rente I doe alsoe gyve to my said Sonne Thomas, towards his bringinge up in earninge. THOMAS TUSSER.

Item. I give also to the said Thomas my Bookes of Musicke and Virginalls. THOMAS TUSSER.

Item. The residew of all my Bonds, Goods, and Chattells, moveable and immovable, in Chesterton, aforesaid, or ells where being in this my last Will and Testament unbequeathed, I give to Amye, my Wyef, dischardging all my Debtes and Funerall Expenses, not amountinge unto above the summe of Twentye Marckes. And of this my last Will and Testament, I constitute my said Sonne, Thomas Tusser, my full and whole Executor; and yf he happen to dye before he accomplishe his full Age of Twentye and One Yeres, then I doe constitute and make John Tusser, my second Sonne, my Executor; and yf yt fortune the said John to dye before he accomplishe the age of XXI Yeres, I constitute and make Edmond Tusser, my Sonne, my whole Executor: and yf yt happen the said Edmond to dye before he dothe accomplishe and come to the Age of XXI Yeres, I do then make and constitute Amye Tusser, my Wyef, my full and whole Executor of this my last Will and Testament. THOMAS TUSSER.

Item. I doe constitute, ordaine, and make one Edmond Moon, gent., Father to the said Amye, my Wyef, and Grandfather to my forenamed Children, my said trustie Frend before mentioned in this my said last Will, Guardian and Tutor unto my forenamed Children, and Supervisor and Overseer of this my last Will and Testament, unto whome I doe, next under God, comitte bothe my Wyef and my forenamed Children, trustinge assuredlye that he will take a fatherlye care over them, as fleshe of his fleshe, and bone of his bones.

These whose names be hereunder written beinge Witnesses to this present last Will and Testament :— JOHN PLOMMER,
of Barnard's Inne, in the Countye of Middlesex, gent.,
RICHARD CLUE,
THOMAS JEVE,
JAMES BLOWER,
WILLIAM HYGEART.

MEM.—That William Hygeart dwellethe in Southwerke, with Mr. Towlye, Copper-Smithe; Richard Clue in St. Nicholas Lane, free of the Merchant Taylers'; Thomas Jeve, Ironmonger; James Blower, Servant, free of Clotheworkers.

Sealed and delivered in the presence of the parties abovenamed, JOHN BOOTES,
FRANCIS SHACKELTON,
the Parson of St. Myldred's, in the Poultrie,
JOHN PLOMMER.

Proved in the Prerogative Court of the Archbishop of Canterbury the 8th day of August, 1580, by his Son, Thomas Tusser."

This will recites that he was then in the possession of copyhold lands in the parish of Chesterton, in Cambridgeshire,* and that he also had goods and chattels at the same place. He probably resided there during the latter period of his life, and died during a visit to London, perhaps to superintend the printing of his book; for it is noticeable that the first complete edition of his great work appeared in 1580—the supposed year of his death.

14, *Gray's Inn Square.*

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

A Monthly Council was held at the Society's House, Hanover Square, on Wednesday, June 3; present—The Right Hon. Lord Portman, President, in the Chair; Duke of Richmond; Earl of Ilchester; Earl of Egmont; Earl Spencer; Sir Matthew White Ridley, Bart.; Sir Charles W. Taylor, Bart.; Sir Charles M. Burrell, Bart., M.P.; Sir Charles Lemon, Bart., M.P.; Colonel Austen, M.P.; Thomas Raymond Barker, Esq.; John Benett, Esq., M.P.; S. Bennett, Esq.; Colonel Blagrave; H. Blanshard, Esq.; Colonel Challoner; F. C. Cherry, Esq.; S. Druce, Esq.; H. Gibbs, Esq.; S. Grantham, Esq.; C. Hillyard, Esq.; W. Fisher Hobbs, Esq.; John Kinder, Esq.; E. A. Sandford, Esq.; W. Shaw, Esq.; R. A. Slaney, Esq.; Rev. J. R. Smythies; C. Stokes, Esq.; F. West, Esq.; and George Wilbraham, Esq.

Finances.—Colonel Austin, M.P., chairman of the Finance Committee, presented the Report of the accounts for the month just ended; from which it appeared, that on the 31st May last, the funded property of the Society stood at 7,000*l.* stock, with a current cash-balance of 1,781*l.* in the hands of the bankers. This Report having been adopted, the recommendation it contained, "That no compositions for life be made applicable to the current expenses of the Society," was specially moved by the Duke of Richmond, and confirmed by the Council.

Colonel Austen then called the attention of the Council to the statement of the auditors on the part of the Society, in reference to the necessity of taking decisive measures for the recovery of the large amount of arrears of subscriptions still remaining unpaid; when the Council ordered that the Finance Committee should be requested to hold a Special Meeting for a full inquiry into the case of such arrears, and to make a special report on the subject to the Council at their next monthly meeting in July.

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* Is there any tradition of him there? Are any of the family residing now in that parish, or at Catiwade, in Suffolk? Are any local traditions relating to him existing?

Potato Disease.—The President reported that 56 essays had been received in competition for the Duke of Northumberland's Prizes placed at the disposal of the Society.

Country Meeting.—The Council gave instructions on the selection of the land for the trial of implements; the supply of the Pavilion Dinner; and the preparation of the programme for the ensuing country meeting at Newcastle, in July. They ordered thanks to be returned to the Natural History Society of Northumberland for their liberality in making arrangements for throwing open their museum, day and night, for the inspection of the members of the Society during the period of the Newcastle meeting; on the recommendation of the Finance Committeee, appointed the Northumberland and Durham District Banking Company to be the local bankers of the Society on the occasion of the ensuing country Meeting; and adopted, with emendations, the Report of the Judges' Mileage Committee. The Council then instructed the Secretary to communicate to the various authorities of the cities and chief towns, situate within the districts recently decided upon for the holding of the country meetings for the ensuing four years, the decisions of the Council on that subject; and appointed the following General Northampton Committee for 1847—namely, Lord Portman, Chairman; Earl Spencer, Vice-chairman; Duke of Richmond; Colonel Challoner; Mr. Raymond Barker; Mr. Shaw; Mr. Shelley; Mr. Miles, M.P.; Mr. S. Bennett; Mr. Fisher Hobbs; Lord Southampton; Mr. Hillyard; Mr. Druce; Mr. H. Gibbs; Mr. B. Gibbs; Mr. Pym; and Mr. H. B. Whitworth: appointing at the same time a Special Committee, for selecting from the ample choice liberally submitted to the Council by the authorities of Northampton, the land for the trial of implements next year, consisting of Mr. Shelly, Mr. Miles, M.P., Mr. S. Bennett, and Mr. Brandreth Gibbs, with a request that they will make a report of their inspection and recommendations to the Council at their monthly meeting on the 1st of July.

Miscellaneous Communications.—Mr. Hincks, of Hastings, on Pedigrees of Cattle; Mr. Wilson, on the Preliminary Prize Sheet for the Country Meeting; Major Curteis, M. P., offering a prize of £10 for the best Essay on the means of preventing or destroying the Hop-fly; Messrs. Thompson and Wedlake, and Mr. Blamire, on Entries for Implements at Newcastle; Mr. Kerr, on plans of Drains; Mr. Smart, on Trial of Implements, and Essay for Construction of the Plough; the "Gateshead Observer," on official papers connected with the Newcastle Meeting; Mr. Clarke, on localities near the coast, in England, favourable for the cultivation of Tussac Grass, and on his personal connexions in the Falkland Islands, through whom it would be in his power to carry out any of the views of the Council respecting the collection of the seed of that plant; Dr. Hooker, on the cultivation of Tussac Grass, and on the nature of the Weed occurring in Mr. Fuller's Wheat-land; Colonel Moody, C.E., on sources of information connected with the history of the cultivation of Tussac Grass; Mr. Ormsby Gore, M.P., on Tussac Grass seed received by him from the Governor of the Falklands; Mr. C. Crakanthorp, on Crushing Mangold Wurzel seeds; Mr. Hills, on dissolving Bones; and Mr. Hazlewood, on the System of Agricultural Training adopted at Hoddesdon.

The Council then adjourned to their Weekly Meeting, on Wednesday, the 10th of June.

A weekly Council was held at the Society's House in Hanover-square, on Wednesday, the 10th of June, present: the Right Hon. Lord Portman, President, in the Chair; Earl of Lovelace; Sir M. W. Ridley, Bart.; Sir Trayton E. Drake, Bart.; Sir Robert Price, Bart., M.P.; Thomas Raymond Barker, Esq.; W. R. Brown, Esq.; H. Gibbs, Esq.; W. Fisher Hobbs, Esq.; W. H. Hyett, Esq.; John Kinder, Esq.; W. Miles, Esq., M.P.; E. A. Sanford, Esq.; Prof. Sewell; R. A. Slaney, Esq.; W. R. C. Stansfield, Esq., M.P.; G. Wilbraham, Esq.; R. Archbold, Esq., M.P.; J. Baines, Esq.; Dr. Calvert; W. A. Commerell, Esq.; C. Cure, Esq.; T. Dunne, Esq.; J. B. Glegg, Esq.; J. Greene, Esq.; A. Ogilvie, Esq.; E. Parkyns, Esq.; and T. Turner, Esq.

The following communications were received:—

1. From Viscount Newry—Baskets made of iron wire or rods, galvanically coated with zinc, for agricultural purposes generally.
2. From Mr. Fisher Hobbs—A statement of the advantages derived by Mr. Hudson, of Castleacre, in the employment of similar baskets or pans, made of sheet-iron. [Mr. Hobbs, at the request of the President, signified his willingness to submit specimens of these baskets to the inspection of the members at their next weekly Council.]
3. From Mr. Baker, of Writtle—A communication, through Mr. Fisher Hobbs, on the wheat midge of last year, and the aphides so prevalent on the pea crops at the present time.
4. From the Rev. James Robson—A system of farming accounts, placed by him at the disposal of the special committee on that subject.
5. From Mr. Tweed—An essay on farming accounts, presented by him to the same committee; and a statement of experiments in progress to prove the ready passage of water through the porous material of draining pipe-tiles.
6. From Mr. Short, of Martin—a present of seeds of the cow parsnip, for distribution; and a specimen of bones dissolved by sulphuric acid.
7. From Mr. Blake—A notice on the destruction of the wire-worm.
8. From Mr. Slaney—An offer to place the sums of 10*l.* and 5*l.* at the disposal of the Society, as additions respectively to any prizes the Council may think proper to give for the ploughs best calculated to effect the cutting of drains and the turn-

ing over of the soil taken from them; with suggestions as to the conditions under which each prize should be offered for competition.

9. From Mr. B. Clarke—A statement of the result of an experiment on retarding the germination of turnip-seed.
10. From Mr. Raymond Barker—A notice from Col. Blagrave of the unsatisfactory result attending experiments made on his farm, in reference to the steeping of seeds previously to sowing.
11. From the President—A report of the practical inquiries instituted by Mr. Browne, of Winterbourne-Stoke, on the advantages attending the employment of cut straw for litter.
12. From Mr. Thoume, Mr. Le Beir, Mr. Moyle, Mr. Murphy, and Mr. Gethen—Papers on the subject of the potato disease.

An interesting discussion, with statements of practical experience, on several of the more important topics connected with these communications, having taken place, the Council ordered their thanks to be returned to the respective parties from whom they had been received, for their attention in submitting to them their notice.

The Council then adjourned to their weekly meeting on Wednesday next, the 17th instant.

A Weekly Council was held at the Society's house in Hanover-square on Wednesday, the 17th of June. Present: The Right Hon. Lord Portman, President, in the chair; Earl Spencer; Earl of Lovelace; Sir Francis Lawley, Bart.; Sir Matthew White Ridley, Bart.; Sir John V. B. Johnstone, Bart., M.P.; Colonel Austen, M.P.; T. Raymond Barker, Esq.; Rev. Thomas Cator; Colonel Challoner; F. C. Cherry, Esq.; E. D. Davenport, Esq.; W. Fisher Hobbs, Esq.; W. H. Hyett, Esq.; John Kinder, Esq.; Colonel MacDouall, Esq.; S. Chandos Pole, Esq.; F. Pym, Esq.; E. A. Sanford, Esq.; Professor Sewell; W. R. C. Stansfield, Esq., M.P.; R. Archbold, Esq., M.P.; J. Baines, Esq.; T. B. Browne, Esq.; Dr. Calvert; Colonel Coles; C. Cure, Esq.; W. Cuthbertson, Esq.; T. Dunne, jun., Esq.; C. Eyre, Esq.; A. Glendinning, Esq.; H. Lewis, Esq.; A. Majendie, Esq.; S. Solly, Esq.; T. Turner, Esq.; and T. R. Tweed, Esq.

The following communications were received:

1. Letters from the Secretaries of the Newcastle Literary and Philosophical Society and the Newcastle Farmers' Club, announcing resolutions of their respective Committees, that the Rooms and Library of the former establishment and the Club-Room of the latter association would be thrown open to the free access of Members of the Royal Agricultural Society during their approaching session in Newcastle: for which favours, on the motion of Colonel Challoner, seconded by Mr. Fisher Hobbs, the best thanks of the Council were voted.

2. Communications from Sir Roderick Marchison, K.S.P., one of the Honorary Members of the Society, explaining the object of M. Gripenberg's visit to England, in bringing from his estate in Finland a sowing machine of practical excellence, which had been entered by Mr. Pusey, M.P., on the part of its inventor, for exhibition at the Newcastle Meeting, and had already reached this country in charge of M. Gripenberg: and from M. Tottie, the Swedish Consul, announcing that M. Nathhorst, the Secretary of the Royal Agricultural Society of Sweden, was on the point of leaving Stockholm, by direction of that body, for the purpose of being present at the Newcastle Meeting. The Council gave instructions respecting the due attention to be paid to these gentlemen.

3. Printed proof of the Programme for the Newcastle Meeting, which, having been read by the President, was amended and approved.

4. From Mr. Majendie, of Hedingham Castle, Essex, a supply of foreign Sainfoin Seed, for distribution among the members, for trial of its qualities. Mr. Majendie informed the Council that two varieties of Sainfoin are cultivated in the oolite district surrounding the city of Caen, in Normandy, which is usually called the "Plain of Caen:" one of these varieties being termed the *grande graine*, or *graine à deux coupes* sainfoin; the other, the *petite graine* sainfoin. The former, or large-seeded sainfoin is sown on land of superior quality, and gives *two* crops of hay: the latter, or small-seeded variety is sown on inferior land, and gives only *one* crop; which, however, is by some persons considered to be of more delicate quality. The supply of seed presented by Mr. Majendie consisted of the larger variety, in the hope that it might have its merits tested on calcareous soils in this country. He had himself grown both varieties, and found a difference in the size of the leaf. The President stated his willingness to try a portion of the seed at the present time; and also, as the season was now late for the purpose, to reserve a portion of it for trial next year at the proper time on some of his chalk lands in Dorsetshire, which he had found remarkably good for sainfoin. He thought it very desirable not to let sheep go into it too soon. He recommended the Members who tried this seed to report to the Council their result. Mr. Raymond Baker stated that he had mowed sainfoin twice in the same season on his farm in Buckinghamshire. Mr. Beale Browne had also land of an oolitic character, on which he would try the seed in question. On the motion of Mr. Raymond Barker, seconded by Mr. Pym, the best thanks of the Council were given to Mr. Majendie for the favour of this present.

5. Mr. Fuller, M.P., communicated the progress of his trial of a portion of the wheat and barley sent to this Society from Australia, on the stiff soils of Sussex, for which the Council expressed their thanks. The President at the same time remarked, that however interesting it might be to learn at different dates the progress of any trial of cultivation, the object of the Council was to gain a sound practical result in every possible case, on which they might carefully and securely proceed in their further inquiries; that it was to the result at harvest-time, and at the thrashing and selling of the produce, that practical men looked for satisfactory conclusions.

6. From Mr. Henry Drummond, of Albury Park, Surrey, a copy of the lecture delivered by him, as President of the Guildford Institute, on chemistry applied to the arts; intended to show in ordinary language, and with as few scientific terms as possible, the application of chemistry to agriculture—to give the meaning of the terms employed as they occur—to illustrate its principles by experiments in the power of every one to repeat with great ease; and, in conclusion, to explain the reasons, according to such principles, why some practices in the farming of that part of Surrey were bad, while others, on the contrary, were good. Mr. Drummond also called the attention of the Council to the advantages which would result from an examination of some of the richest pastures in England, such, for example, as those on the borders of Northamptonshire and Leicestershire, with a view to ascertain exactly what grasses are found on a given space, and in what relative proportion to each other; whether the hay from meadows in which the grass is most nutritive when eaten green, is also the best; if not, what the grasses are in those fields where the hay is best. Mr. Drummond doubted whether a considerable quantity of the hay made from natural meadows, so far as the grass is concerned, is worth making, any goodness in such hay being, in his opinion, generated in the rick. Mr. Pym thought that Sinclair, in his work on grasses, had instituted those inquiries to which the attention of the Council had been drawn by Mr. Drummond. Colonel Challoner was well acquainted with Mr. Drummond, and having had an opportunity of learning his views on this subject, he explained them to the Council. The President thought it a great point to ascertain the precise time when the seed of each particular grass was in the best state for being collected for future use. Mr. Hobbs expressed his opinion of the advantages of inoculation in the improvement of pastures, and explained to the Council the mode in which the turf for that purpose is easily obtained, by means of a plough-share with a wing turned up. The best thanks of the Council were then ordered to be transmitted to Mr. Drummond for the favour of his communication.

7. From Mr. Tweed, of Bowater Crescent, Woolwich, a statement of the results of his experiments on the rate at which water enters and again passes out of a cylyndric pipe draining-tile. He stated that, having as a practical man had the most decided doubts concerning the statements made by Mr. Parkes in reference to the mode in which water finds its way into pipe-tiles, he determined to remove them by actual experiment; and having procured at a draining-tile manufactory a pipe 4 feet long and 1½ inch in diameter, open only at one end, he soon found, by placing such tube in water with its closed end downwards, that the water permeated through the substance of the pipe, and formed within it a column of water, increasing in height at the average rate of 1¼ inch per hour, which, on the removal of the pipe from the water and its vertical suspension in the air, again permeated back again through the pores of the tile, at the average rate of ¼ inch per hour. Mr. Tweed exhibited to the Council one of the pipes he had employed in these experiments, and in conclusion stated, that however sceptical he had previously been on this subject, he was now perfectly convinced, along with several eminent military engineers, who had been equally sceptical with himself, that Mr. Parkes was perfectly correct in his statements—that it was more easy to explain how the water got into the pipes, than to devise means how it was to be kept out. A very interesting discussion then ensued, in the course of which Sir Francis Lawley stated his experience for two years in strong clay, and that of Mr. Harvey, of Epping, for twenty-seven years, of the satisfactory result attending the use of pipe-tiles. Colonel Challoner mentioned the success with which he had luted collars to the pipe-tiles with well-worked raw clay in draining the running sands on his estate; and with reference to the diameter of the pipe-tile for draining generally, he understood that sewerage companies had already begun to reduce the size of their drains for the purpose of their being cleansed by the increased fulness and velocity of current which such contraction occasioned. Mr. Chandos Pole related cases in the early use of pipe-tiles without collars in sandy soil, in which artificial springs were occasioned in the field by the blowing up of the drains arising from the displacement of the tiles; Sir Matthew Ridley cited the experiments of Dr. Buckland in Buckinghamshire; Mr. Fisher Hobbs expressed his doubts whether so ready a permeation of water through the pores of tiles would take place in the finer material of blue clay, of which the white bricks and tiles were made; Mr. Sanford conceived that absorption would prove to be the criterion of permeation, and that, if a brick or tile acquired weight by immersion in water, such material would, to a certain extent, and under favourable circumstances, allow water to pass through a pipe or tile composed of it; the President reminded the Council that it was always important to bear in mind the given circumstances and conditions of an experiment, and to avoid being misled by an illogical or undue generalization—that in the present case Mr. Tweed had made an experiment, and, according to the care and exactness bestowed upon it, that experiment gave true results under the given circumstances of its particular case as affected by the material used and the pressure of water employed—that in the repetition of any experiments an exactly similar result could only be expected under exactly similar circumstances, the experiment proving or showing just so much and no more. Mr. Sanford took that opportunity of giving to the Council an interesting account of draining running sands by means of poles or thinnings of larch, and stated the accidental circumstances which had led to his operations, and the satisfactory results with which they had been attended: ground perfectly drained, and on which sheep were now feeding, having three years ago been a floating bog, on which a stone could not be placed without being buried. The President, Sir F. Lawley, Sir M. Ridley, Mr. Chandos Pole, and Mr. Fisher Hobbs then detailed the advantages or disadvantages they had found to attend the use of particular kinds of wood, as that of alder, willow, thorn, Scotch firs, &c. The Council then gave

their best thanks to Mr. Tweed for the favour of his communication.

8. From Mr. Mechi, of Tiptree Hall, near Kelvedon, an invitation to the members to pay a visit to his farm in Essex, for the purpose of inspecting the comparative effects of thick and thin sowing, of dibbling by Newberry's machine, of dropping by Bentall's dropper, of consolidation by Crosskill's roller, of the extensive use of Garrett's horse-hoe, and of deep and shallow draining generally. The best thanks of the Council were ordered to Mr. Mechi for the favour of this invitation.

9. From Messrs. Walker, of Gospel-oak Works, Tipton, Staffordshire, a collection of various articles as specimens of the facility and extensive employment of iron coated galvanically with tin, for the purpose of protecting it for a long period from the corrosive action of exposure to the weather, and of obviating the necessity of repeated paintings being applied to such out-door work. These articles consisted of hurdles, pans, lattice, hooks, spouts, nails, screws, grates, chains, and hooped tubs, all of which could be coated with tin by Messrs. Walker's process, at an expense varying according to the construction of the article, from 5s. to 15s. per cwt. The Council ordered their best thanks to be returned to Messrs. Walker for the favour of these presents.

The Council then adjourned to their weekly meeting on Wednesday, the 24th inst.

NEW MEMBERS.

Allnatt, John J., Wallingford, Berkshire
Angus, Geo., Riding Mill Station, Newc. and Carlisle Railway
Armstrong, George, Heddon-on-the-Wall, Newcastle-on-Tyne
Armstrong, Charles, Axwell Park, Gateshead, Durham
Askew, Sir Henry, Fallingburn House, Coldstream, N.B.
Atkinson, Ralph, South Gosforth, Newcastle-on-Tyne
Back, John Alfred, Hethersett Hall, Norwich
Bailey, William, Hazling, Belford, Northumberland
Barker, James, North Shields, Northumberland
Barns, Thomas, Whitburn, Sunderland
Bent, John, Liverpool
Borrer, Nathaniel, Parkyns, Hurstperpoint, Brighton
Brandling, R. H., Gosforth Hall, Newcastle-on-Tyne
Brown, John Thomas, Norwich
Brown, John, Eldon Place, Newcastle-on-Tyne
Bruce, Rev. John Collingwood, Newcastle-upon-Tyne
Burnett, Nicholas, Black Headley, Northumberland
Buston, Roger, Buston, Alnwick
Charlton, W. H., Brandsby Hall, York
Cholmeley, Waldo, Torr Royal, Tavistock, Devon
Clark, John D., Christon Bank, Embleton, Alnwick
Clay, John, East Bolden, South Shields, Durham
Collingwood, Edward, Tissington Hall, Newcastle-upon-Tyne
Coulson, Colonel, Blenkinsopp, Haltwhistle, Northumberland
Cresswell, W. G. Baker (11th Hussars), Cresswell, Morpeth
Dand, Robert, Field House, Alnwick, Northumberland
Davidson, Thomas Atkinson, Police-station, Manors, Newcastle-upon-Tyne
Davison, Ralph, Chapel House, Newcastle-upon-Tyne
Davy, John, Barton, Rose Ash, South Molton, Devon
D'Augny, Octave Perin, Kippentroff, Grand Duchy of Luxemburgh
De Broke, Lord Willoughby, Compton-Verney, Stratford-on-Avon
Dickson, John, Peel Walls, Ayton, Berwickshire
Dobson, William Juplington, Morpeth
Elliot, Rev. T. Elphinstone, Whalton Rectory, Morpeth
Ettrick, Anthony, High Barns, Sunderland
Fenwick, John Manners, Gallow Hill House, Morpeth
Fenwick, John, Newcastle-on-Tyne
Garrard, Robt., Athelington Hall, Worlington, Woodbridge
Geldard, John, South Benwell House, Newcastle-upon-Tyne
Gilpin, George, Sedbury Park, Richmond, Yorkshire
Grantham, George, Barcombe Place, Lewes, Sussex
Gray, Edward, Leazes, Burnopfield, Gateshead
Green, Thomas, Trench Hall, Gateshead
Green, Josephus S., George-street, Newcastle-upon-Tyne
Groves, Joseph, Radipole, Weymouth, Dorset.
Harter, Rev. George Gardner, Cranfield, Newport-Pagnal
Head, Charles, Hexham, Northumberland
Hepworth, Joshua, Rogerthorp, Pontefract, Yorkshire
Hetherington, Joseph Walker, Newcastle-upon-Tyne
Hickman, Henry, Newnham, Daventry, Northampton
Hodgson, James, Eldon Street, Newcastle-on-Tyne
Hodgkinson, Rev. G. C., Principal of the R. A. College, Cirencester
Honywood, W. P., Marks Hall, Kelvedon, Essex
Hughes, Geo. Hughes, Middleton Hall, Wooler
Hughes, Edward, Hill House, Ashford, Kent
Humble, Joseph Wright, Jesmond, Newcastle-on-Tyne
Hutton, William, Shotley Bridge, Durham
James, Herbert George, 44, Fish-street-hill, London
Jobling, John, Seaton House, Blyth, Northumberland
Jobling, Mark L., Percy-street, Newcastle-upon-Tyne
Johnson, Edward, The Deanery, Chester-le-Street, Durham
Johnson, George, Willington, Newcastle-upon-Tyne
Jolly, John, Acomb Grange, York
Jopling, John, Seaton Lodge, Seaton Sluice, North Shields
Kell, William, Gateshead, Durham
Lamb, Joseph, Axwell Park, Newcastle-upon-Tyne
Langford, Frederick, Udimore, Rye, Sussex
Liddell, Hon. Henry Thomas, M.P., Ravensworth Castle, Durham
Limerick, Earl of, Ditcham, Petersfield, Hants
Lishman, William, Fenwick Shield, Stamfordham, Northumberland
Lopwith, Thomas, Allanheads, Hexham, Northumberland
Lowes, John, Allen's-green, Haltwhistle, Northumberland
Lowman, Robert, Crewkerne, Somerset
Lucy, William Fulke, Charlecote Park, Stratford-on-Avon
Milne, E. W., Pitt Farm, Cartmell, Milnthorpe
Morriss, Robert Martinson, Carville, Newcastle-upon-Tyne
Morriss, Nicholas, Blue House, Washington, Gateshead
Ormston, John, Cumberland-row, Newcastle-upon-Tyne
Parkinson, William, Gateshead, Durham
Pearce, Calonel William, Fowdgrech, Brecon
Phillips, Thomas, Helmsley, York
Potter, Addison, jun., Heaton Hall, Newcastle-upon-Tyne
Powell, John Folliott, Welwyn, Herts
Ralph, Rowland Westby, Halifax, Yorkshire
Rayne, Charles, Carville Hall, Newcastle-upon-Tyne
Richardson, Edward, Cresswell House, Sunderland
Riddle, Thomas, Felton Park, Northumberland
Robinson, John, Horton, South Shields, Durham
Robson, Daniel, Shipcote, Gateshead, Durham
Robson, Rev. James, Ponteland, Newcastle-on-Tyne
Roper, Roper S. D. R., Sedbury, Richmond, Yorkshire
Salusbury, Rev. Trelwall J. T., Offley, Hitchin, Herts

Shaftoe, Rev. A., Whitworth, Durham
Smith, William, Haughton Castle, Hexham
Smith, Anwick, Langley Grove, Durham
Smith, John, Lady-Kirk, Northumberland
Smyth, Rev. Christopher, Little Houghton, Northampton
Smyth, William, Little Houghton, Northampton
Sowerby, John, Shipcote House, Gateshead
Spittal, Alexander, President of the Isle of Man Agr. Soc., Douglas
Swinburne, Robert Walter, Cleadon Cottage, South Shields
Thorp, Ven. Archdeacon Charles, D.D., Ryton, Newcastle-on-Tyne
Todd, Frederick Swan, Picton House, Newcastle-upon-Tyne
Todd, William Robert, Picton House, Newcastle-upon-Tyne
Umbers, William, jun., Wappenbury, Leamington, Warwickshire
Walker, John, Prestwick House, Newcastle-upon-Tyne
Wallis, Robert, South Shields, Durham
Watson, John, Kendal, Westmoreland
Webber, W., Moulton Paddocks, Newmarket
West, Desaguliers, Hartfield Lodge, Tonbridge Wells, Kent
Wharton, Rev. William Fitz-William, Barningham Rectory, Greta Bridge, Yorkshire
Wharton, Rev. James Charles, Gilling Vicarage, Richmond, Yorkshire
Wheldon, Stephen, Pelton, Chester-le-Street, Durham
Whitworth, W., Earls Barton, Wellingborough, Northampton
Wilkinson, John Etridge, Dunston Lodge, Gateshead
Wilding, Charles, Powis Castle, Welshpool, Montgomeryshire
Woodd, Basil Thomas, Aldbro' Lodge, Boroughbridge, Yorkshire
Wright, James, Blyth, Morpeth, Northumberland.

DIRECTIONS FOR THE BETTER CULTIVATION OF THE TRIFOLIUM INCARNATUM, OR SCARLET TREFOIL.

Immediately after harvest, sow or drill a peck and half of the seed per acre on a wheat subsoil, without ploughing, and harrow it in; if the land is ploughed, after sowing and harrowing it must be left rolled down as smooth and hard as the planks of a barn floor. It has been said that the trifolium will not bear our winters; this may be true when imported from Italy, or the south of France; I brought mine from Switzerland, and it has now been eighteen winters on my land, and I have little doubt but it would endure the winter in any county south of the Grampian hills. The more sheltered the situation, the earlier in spring it will lift its crimson head to the returning sun.

On light lands, where, in dry summers, the clovers are grilled into tinder—where a barber with a quick eye, a sharp razor, and a steady hand is the best husbandman—half a peck of the trifolium seed sown on the young clover directly after harvest, and harrowed in, would double the crop of stover and do the after-feed no injury: if the farmer grows the seed himself, it will cost him but *one shilling*, as I will presently prove. Whenever I am doubtful of my young clovers, I always do this. I am not advocating growing the trifolium as a crop in place of the clover; this mistake has been made, and it is a great one; it leaves the land in too frothy a state for the wheat—more especially on light soils: it should be sown as a crop after the wheat, not before it. Sheep and lambs prefer it to clover, before it blossoms; and, when made into stover, will eat the whole greedily. Dry land suits it best; on low places, on heavy land where the water stagnates, it is likely to lose plant. If the agriculturist grows the seed himself, an acre of tares costs him four times the amount of an acre of trifolium; and he may easily prove, himself, that one acre of the latter is worth two of the former.

The land on which the tares and trifolium are grown is the fallow; and whether these green crops are there or not, the rent, tithes, and parochial expenses must be paid; therefore the only just charge that can be brought against them is the seed. I will only reckon two bushels of tares—some sow three—thirteen shillings. Now let us see what the trifolium will cost. The average growth of the seed used by me has been fifteen bushels per acre. If cut when the straw is green (which it may be without injuring the seed), thrashed the next or following day, and stacked directly, the straw will pay all the workmanship. When it is further considered that the crop is generally clear from the land the first week in July, leaving the best months of summer for fallowing, six pounds per acre is a full remuneration for this crop—this brings the seed to two shillings per peck: thus the farmer may have an acre of trifolium, in all its luxuriancy in the month of May, for three shillings—less than one-fourth part the cost of his washy, slip-slop tares. Tares are at all times better physic than food; and in wet, cold summers, they are for horses that which seamen and soldiers designate bad small beer—swipes. As the potato occupies the lowest step of degradation as food for civilized man, so do the tares for the brute; they are Frenchman's water-soup twice diluted. As for making them into stover—set the Thames on fire!

Just before the trifolium begins to blossom, put two or three horses to it, in one yard; the same number to tares in one separate; keep them thus for one month; the farmer will require no further proof of the superiority of the former, the light will break upon him as the rising sun in a cloudless July morning.

I will grant that the scarlet trefoil is not so certain a crop as the tares; but what does this amount to? I have forty acres of fallow every year; if I sow the whole with trifolium, and one-half fails—very unlikely—on this twenty acres, I lose three shillings per acre; the twenty acres which remain will pay ten-fold for the whole—the other is ready for fallow, or turnips, as it was ultimately intended.

I have had above three waggon-loads of trifolium stover per acre; therefore, exclusive of cutting and getting up, it cost but *one shilling* per load. If I lost half the crop, as above stated, it cost two. I have grown it, side by side, with the long fallow; the same with the tares;

and I could see no difference in the crops that followed, except that the clover was always better after the trifolium than after the tares. All this is no wild theory—no gaudy vision; it is the practice and experience of eighteen years.

Let not the farmer dream he is buying the seed this year at eight shillings per bushel; if he does he may, probably, awake and find it two pounds—and cheap too: it has been four. One peck and half of the bushel will give an acre of green food next May, worth nearly double the sum; a second peck and half, on good land, will produce three waggon-loads of stover; and the remaining peck, from ten to twelve bushels of seed. It is pleasing to reflect that the farmer cannot undergo the same excitement for his two pounds, as a dealer in railway shares, or time-bargains, at the stock-exchange—kick out a pair of new sheets in one night.

The first step towards a good crop is good seed. I have seen bushels of seed sold for trifolium, that was not worth its weight in sand. When the price is high, it floods in from France, of all descriptions, good and bad; perchance mixed with dodder, and other parasites. We are already indebted to the French for *something*, for which *something* they say they are indebted to the Italians; however, no matter, let this pass; at all events we require them to give their name to nothing further as a memorial of them—there is no chance of their being forgotten.

Permit me to say a few words, before concluding, to my nearer neighbours and friends. Let them forget—if they can—that the trifolium was first introduced by one educated for a profession, not for farming; let them believe—if they can—it was introduced by one bred, and born, and nursed upon a farm, from infancy to age; then let them put their heads and hands to the task, with a good will, to mend that which is wrong—not to mar that which is right. However, whether they do this, or do not do it, let them be assured that the trifolium is now planted in our soil for ages to come—it has become a denizen of our land, a flower of our fields, and food for our stock, that will be cultivated by generations yet unborn; and when life's short but toilsome race is run—when the spiritual vision shall pierce through the darkness, toward brighter scenes of light and life—when the chaff shall be winnowed from the wheat, I trust it may be found that I have, at least, contributed one grain as a benefactor to my country. J. Foaker.

Kirby, Colchester, June, 1846.

THE BEST WAY TO KEEP FARM HORSES.—Dr. Sully, of Wiveliscombe, in the county of Somerset, has, with success, adopted the following method of feeding his horses, which constantly work hard, and travel at the rate of eight or nine miles an hour. He has for upwards of twenty years followed the same plan. In his stables there are no racks to hold hay, as he considers it a wasteful method of feeding; and that the horses, when they have the command of their heads, pull the hay out of the rack, and throw a considerable portion of it under their feet, and that thirty pounds of hay and upwards are often consumed in this way, and spoiled in the twenty-four hours: whereas, when it is cut and mixed with a due proportion of cut straw and bruised corn, ten pounds are sufficient. In the loft above the stable proportional quantities of food sufficient for the daily consumption of each horse are prepared; a pipe is made to pass from the loft into each manger, and close by the top of the pipe is placed a tub capable of containing sufficient for a horse for twenty-four hours. To prevent the horse from tossing the mixed food out of the manger, cross-bars are nailed on the top of it at twelve inches apart; the cut hay and straw, and also the grain, are regularly weighed out; and when the ingredients are prepared, the proportions for each horse are allotted. The table, which follows, shows the articles of food given, as also the quantities and weight which the horses should receive:—

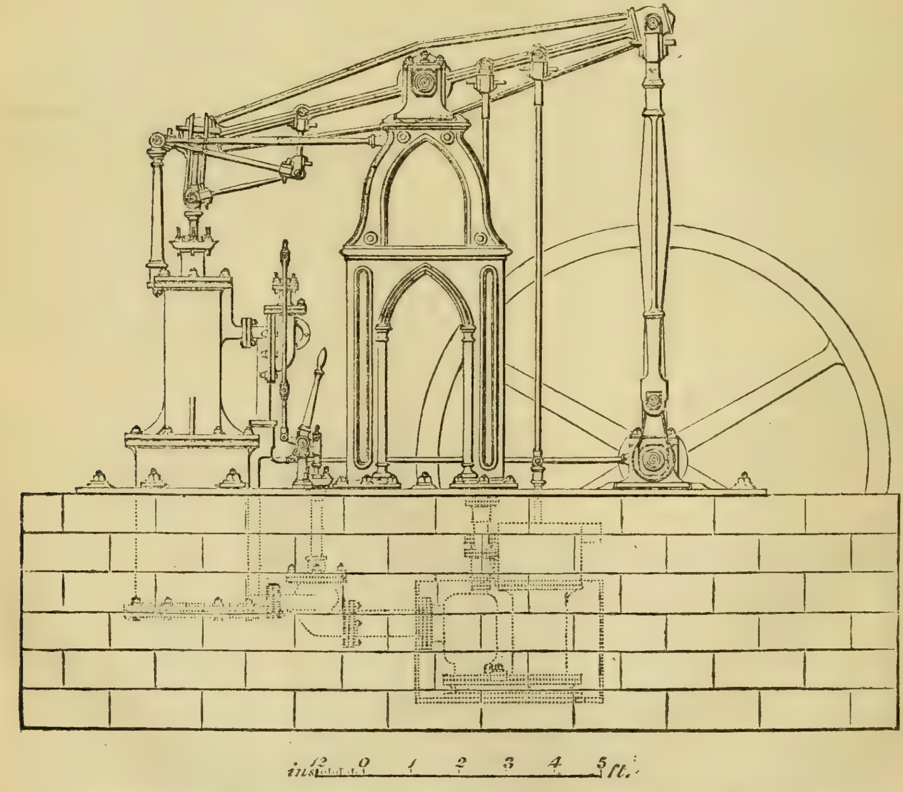
No.	1st.	2d.	3d.	4th.
	lbs.	lbs.	lbs.	lbs.
1. Farinaceous substances, consisting of bruised or ground beans, peas, wheat, barley, or oats	5	5	10	5
2. Bran, fine or coarse..............	0	0	0	7
3. Potatoes, boiled or steamed, mashed in a tub with a wooden beater	5	5	0	0
4. Fresh grains (boiled barley)......	6	0	0	0
5. Hay, cut down into chaff.........	7	8	10	8
6. Straw, ditto	7	10	10	8
7. Malt-dust or ground oilcake......	0	2	0	2
With 2 oz. of salt in each class...	30	30	30	30

By this table it will be seen that each horse receives thirty pounds of food in twenty-four hours—a quantity which will in all cases be found to be amply sufficient; the addition of two ounces of salt is necessary to assist digestion. It is known that all herbivorous animals in their wild state resort to this condiment wherever it is to be met with, and where native salt abounds. In Cheshire there is a farm on which there is a salt spring, to which the cows daily resort; and this farm is particularly noted for the excellence of its cheese; and it is believed that the tasting of this brine by the cows adds to the flavour of their milk. Of the four classes into which Dr. S. divides his ingredients for feeding horses, those two which contain the steamed potatoes are most recommended.

HARLESTON FARMERS' CLUB, Seventh Meeting for 1846, June 10.—Subject, "The Assessment of Cottage Property."—Resolution: "It is the decided opinion of this meeting that the present system of collecting the poor-rates from the tenants of some cottages, and excusing others, is partial and unfair; as, however deserving of relief such tenants may be, the property they inhabit is justly entitled to pay its share of the expenses of maintaining the paupers belonging to the parish in which it is situated. The club considers that the only remedy for such a state of things is to make the payment of rates compulsory on the owner of the property through the tenant, in all cases where the nett assessment does not exceed 6*l.*; the receipt to be a legal tender to the landlord for such portion of the rent."

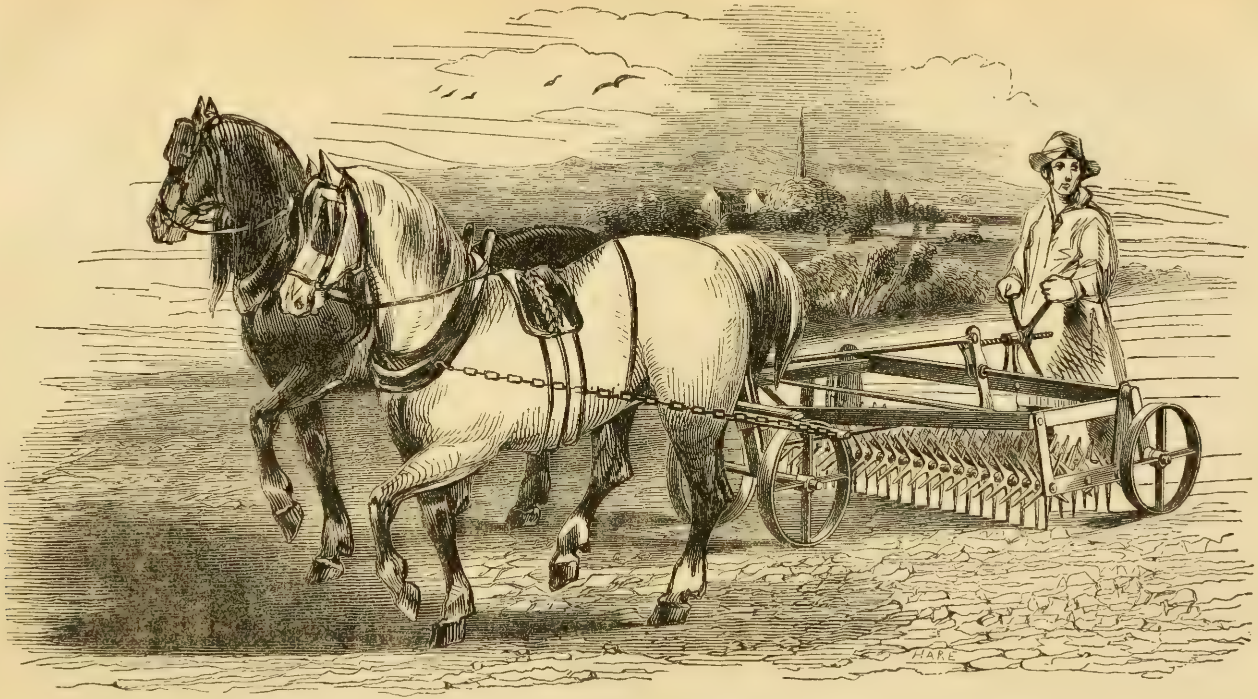
FARMING OF CORNWALL.—AGRICULTURAL IMPLEMENTS.

The construction of the agricultural implements generally in Cornwall, within the last few years, is very good—the Cornish being very ingenious in contriving those best suited to their wants, and although not turned out of hand in "Messrs. Ransome's best style," many of them may claim the merit of originality, and, in point of usefulness, might compete with those of any county in England. The old lumbering wooden ploughs are fast giving place to iron ones; and the swing-plough, wheel-plough, turn-wrest plough, and skim-coulter ploughs, are now made on the most approved construction, and found on most farms where any pretensions to good husbandry exist. The scarifiers, turnip and manure drills, turnip-cutters, and horse-hoes, are made on the same principle as those in most repute. Many of our thrashing machines are exceedingly well made, being built of cast iron, and will thrash 40 bushels of wheat or 60 bushels of barley in an hour. We have a great many thrashing machines worked by water-power, its advantages over horse power being very considerable, as the motion is more regular, and the work better and more cheaply and quickly done. But it frequently happens that ample water-power cannot be obtained, and in a few instances steam-power has been had recourse to. We have three thrashing-machines worked by steam in our own district; one of them has been worked on Trewithen Farm for the last 30 years. I have given a drawing of a steam-engine of six-horse power, adapted to farming purposes, constructed by Mr. Sims, of Redruth, on his patent improved principle, which is a very great improvement on the common "high pressure engines" in the saving of coals of full 50 per cent.; the expense of fuel not exceeding 2½d. per hour. The price of one of these engines varies from £180 to £200. In addition to the principal object for which it is intended—thrashing of corn—it can easily be applied to a variety of subordinate purposes, such as the shaking of straw, winnowing and bruising of grain, chaffing of straw, grinding of malt, of oil-cake and rape-cake, and bones; and in addition to all this, it can easily be adapted to the steaming of turnips, potatoes, and chaff, by applying the steam from the engine-boiler for this purpose—and thus a complete steaming apparatus for the cooking of food for cattle, horses, and pigs, may be cheaply and easily obtained.—Prize Essay by W. F. Karkeek.



STEAM-ENGINE OF SIX-HORSE POWER, ADAPTED FOR FARMING PURPOSES.

REGISTERED NORWEGIAN HARROW AND CLOD-CRUSHER.



By George E. Frere, Esq., of Roydon, and Mr. B. T. Stratton, of Bristol,

We last month presented our readers with an engraving of Crosskill's Patent Clod-crusher and Roller, which in the cultivation of land for *wheat, &c.,* has been found so eminently useful. We have now the pleasure of introducing to their notice another implement, the use of which in preparing *heavy land* for turnips and barley, has this season been highly spoken of by many of the most intelligent agriculturists in the kingdom. We have little doubt that its merits on soils on which it has been hitherto untried will in a short time be fully established. Its peculiarity as a clod-crusher is, that it pulverizes without consolidating, and that, however close or tenacious may be the character of the land on which it is used, it leaves it in a finely pulverized open state, not merely on the surface, but to a depth of several inches. We think, however, from its mechanical action, that its chief merit will be found to consist in its *clod preventing* qualities when used after the plough instead of the common scratch harrow, as it leaves the land in a state rather resembling a garden bed, forked and raked, than anything hitherto seen in field culture.

We remember noticing this implement when first introduced to the British agriculturists at Shrewsbury, in 1845, when it was honoured with a prize from the Royal Agricultural Society, and were much struck with its performance even in its then imperfect state. We sincerely congratulate the Messrs. Stratton of Bristol, on the successful issue of their well-directed efforts for its improvement; we consider their apparatus for throwing it in and out of work most excellent and original. This implement will, doubtless, be exhibited at the ensuing Newcastle meeting, when many of our readers will have the opportunity of judging for themselves of its merits.

CULTURE OF ROOT CROPS IN THE WEALD OF KENT.

Cranbrook.—On Wednesday, May 13, this club which has but very lately been established, met for the discussion of the best mode of culture of root crops in the Weald of Kent and Sussex. Mr. Robert Springett was called to the chair. Mr. Barnes, of Staplehurst, commenced the discussion, and in the course of his observations remarked:—

"What farmers wanted to know was, how to plough, and to sow, and to reap, and to mow in the best possible manner. There was not an individual but must have learned something on his own farm at some time or other, and was therefore able to tell his brother farmers something they had not previously been made acquainted with. But in simply relating to each other their own experience, and their own opinions, they should always endeavour never to allow that difference of opinion, that would always be found to exist, to destroy friendship. The best method of cultivating root crops in the Weald of Kent and Sussex, was a subject comparatively new to these parts, and he supposed that 25 years ago a man might as well have thought of growing root crops in the moon as in the stiff soils in the Weald of Kent and Sussex. Now, however, the fact was placed beyond the possibility of a doubt; they were not met to consider whether the thing could possibly be done, but the best mode of doing it. Supposing he had a field of ten acres, he would drain it all over with tiles of half an inch; his plan had been invariably to make these drains four rods apart, and this gave 40 rods to the acre, the expense of which amounted to about £2 18s. per acre. He then ploughed the land in the opposite direction, or across the drains about eight or ten inches deep, and after this he used the subsoil plough, so that the earth was loosened 16 or 17 inches deep. But he never allowed his horses to walk in the furrows, but along the side of the furrow, on the unploughed land. If the horses walked in the furrow, and especially in wet weather, it was no use using the subsoil plough. On the contrary, the horses trod the ground closer than it was before. In thus ploughing his land, he employed five and six horses. By thus ploughing the land so deep, and using the subsoil plough, is enabled the water to drain off; and as the drains were but four rods apart, it gave but two rods of land to each side of the drain. He ploughed the land before Christmas—if he could, before the wheat season commenced. He then allowed the land to lie still till he commenced getting it in readiness for the turnip crop. When he commenced this operation he found, if they had had but a moderate share of frost (though he greatly feared that as they had had no frost this year he should not succeed in getting a season) that the land was easily worked. He never ploughed his land after the first time, except on one occasion he ploughed it twice, and then he was unsuccessful in getting a season. After the land had remained all the winter, he commenced working it, by harrowing, nidgetting, &c., as deep as he possibly could. By this method he never failed in getting a very fine season, he would press upon them the necessity of ploughing the land in the early part of the winter, for if they neglected it till too late, they would fail in getting a good turnip crop; the ground wanted to be thoroughly pulverized. After having made his season, he then sowed the seed broadcast, and he sowed about a gallon and a half to an acre. He thought it was not well to be too sparing of seed and he was often very much surprised at the parsimony of some farmers in turnip seed, especially when he recollected these two things, the many enemies the turnip had to contend with, and the large quantity of wheat, oats, and other kinds of grain they sowed to the acre. He liked to sow his turnips so thick, that the enemies of this crop might have as much as they liked to eat themselves, and after that leave as many of the plants as he himself required for the crops, and he had never yet been disappointed. He then set the turnips out in rows. Although he sowed broad cast, yet on account of his sowing so much seed, the plants generally stood thick enough to allow them to grow in rows. He first made holes on both sides the field, at the proper distance apart for the rows, and then he stretched a line. He had a boy on one side to move the line when required, and the man who used the brake moved it on the other side. For as the man went down with the brake on one side of the line and up the other, he always moved the line, when he was on the opposite side of the field to that of the boy. Thus they would perceive that the line was always moved once for every two rows. He got about three acres of turnips done in this manner in a day. The first time he went over the ground he set the brake narrow, because it should not cover the plants in the row; but the second time of going over it he set the brake at the usual width. The next process was hoeing and singling the plants out in the row. The man with the hoe singled them out at about eight or ten inches apart, by giving two or three strokes with the hoe, and after him followed women and boys to further single the plants out where two or three were left together. After this he continued the use of the brake among them during the remainder of the summer. He got them pulled at about a farthing a bushel, and it was not a bad job at that price.

THE LONDON FARMERS' CLUB.—MONTHLY DISCUSSION.

ON INSECTS DESTRUCTIVE TO GROWING CROPS.

The usual monthly meeting of the London Farmers' Club was held, on Monday, June 1, in their room at the York Hotel, Bridge Street, Blackfriars. Mr. Baker, of Writtle, Essex, presided.

The Chairman, in opening the business of the evening, stated that the subject which stood on the card for discussion that night was, "On insects destructive to growing crops." He had himself undertaken to introduce the matter to the meeting, and he would now proceed to offer a few observations which had occurred to him in relation to this very interesting subject. "One of the insects highly destructive to growing plants is the cock-chafer. It frequents deciduous trees in May or late in April; its duration of life is about one week in the perfect state, at which it is a long period in arriving. The female deposits her eggs in the earth to the number of from 80 to 90. In about fourteen days the embryo bursts forth in the form of a very minute worm; in twelve months the larva of the insect is half an inch in length, and about the thickness of a quill. In this stage of its existence it devours the roots of plants. In the second year it is an inch long, and as thick as a child's finger; in the third year an inch and a-half long, and as thick as a man's finger. In colour it is yellowish white on the fore part of the body, the abdomen violet, and the head and feet a yellowish red. It changes its skin every spring, and at the approach of winter burrows deeply into the earth, to the depth in fact of six or eight feet. In the beginning of the fourth year it bursts into the pupa state, assuming the form of the perfect insect, and continues to approach its true development until the fifth year, when it is perfect. It leaves the pupa state a soft and white beetle, in ten or twelve days is perfect, gradually approaches the surface of the ground, and becomes an inhabitant of the air a perfect fly. The larvæ destroy every kind of culinary plant, as well as the grass of meadows and corn. The perfect insect is equally destructive. It attacks cherry, apple, pear, and nut trees, as well as the vine and the oak, beech, and chesnut; but it never injures the lime. All birds destroy them, and some other animals—moles and pigs, for instance—are fond of them. The *elater lineatus*, or lined click-beetle is another very destructive insect. I believe it is called the click-beetle, from a habit it has of turning itself over on its back, and making a slight clicking noise as it does so. In colour it is iron black, or blackish with grey hairs, the feelers and legs are a brownish yellow, and the wing covers are striped with grey. It deposits its eggs in decayed vegetable matter and tufts of grass, about the latter end of May, at which period it is most prevalent. If at the end of May there should be a good deal of wet weather, there will, in all probability, be very few the next year; but if the weather should happen to be fine and warm, a large quantity of them may be expected to show themselves the following summer. The larva produced by it is a little long wiry worm, or grub, with legs. It is linear, slender, flat, shining, and smooth, slightly hairy, and of a brown colour. It is so exceeding wiry in its character that it is not easily crushed or broken, and consequently there is great difficulty in destroying or getting rid of it. All birds are, however, exceedingly fond of it, especially the rook. I examined a rook which was shot on a farm of mine, and no less than eighty of these wire-worms were found in his maw. The fact shows how destructive rooks are to this description of insect; and perhaps, therefore, by killing them they in part pay us for the destruction they themselves do among the corn crops. The injury done by these insects extends over two or three years. It seems quite uncertain when they enter into the perfect fly state; they may in the following season, or may not for a much longer period. They appear to have the faculty of prolonging their existence in the chrysalis state; as long as they are well fed they will remain so, and take an opportunity of emerging when they have no longer anything to eat. They do not pass at any certain and fixed period from the one stage of their existence to the other; they wait in fact, until the time arrives when it best answers their purpose to enter upon the pupa state. It would be quite useless to treat upon insects and their particular habits, unless practically prepared in some way to show how the evil consequences of their destructive propensities may be got rid of (*hear, hear*). I have not the slightest hesitation, however, in saying that the processes of farming may be so carried out that if the evil shall not be entirely got rid of, it shall at least be very little injurious. The plan which I have adopted is this—I have made it a point not to sow any rye-grass, and with the light qualities of soil to plough every second year. Now, since I have carried out this system, I have not had my land infected with the wire-worm. From having seen some badly farmed land, for a succession of years, overrun with wire-worms, I endeavoured to trace out the cause, and I observed that they were never produced except where there was decomposing vegetable matter. Upon this it occurred to me that if I ploughed the land before the grass accumulated, I should rid myself of these insects; and such has been the result of the adoption of this plan, that, during the last ten years, I have never seen any of the effects of the wire-worm on the land upon which it was carried out (*hear, hear*). Other lands upon which this plan was not adopted were very much infected with wire-worms. To my great mortification indeed, one crop of oats was almost destroyed by them. After the previous crop a large quantity of grass had been allowed to accumulate, and was then ploughed in; and to that cause entirely I attribute the presence of the wire-worms in large numbers. If this land had been kept free from grass as the other was, I have every reason to believe that this would not have been the case. Having traced the cause, and found that the grass was the inducement to the generation of the wire-worms, I got rid of the inducement, and have since been troubled with them to a very small extent. In ploughing up old grass layers the first crop is very apt to suffer from the same cause; in fact it is only rarely that we can succeed in such a case, except by paring and burning previously to sowing the land with oats. It seems probable that these have increased with the improved system of farming, and since the plan of summer fallows has exploded, especially as grass crops are introduced. It is pretty certain that the eggs are deposited near the surface, as by paring very thinly they are more effectually destroyed than they are by ploughing deeply; by raising a small quantity of the soil, and harrowing and rolling, a large quantity may also be destroyed. I can speak from my own experience in this matter, for wherever I have ploughed upon grass layers the land has been much infested by the wire-worms, but by a proper rotation of crops it can soon be got rid of. One very efficacious mode of getting rid of them is to sow the land with white mustard, which is so exceedingly offensive to them that you will find no more for several years. A gentleman of my acquaintance did this in three succeeding years, and in every instance he found it answer most perfectly. He found all those portions of the land where the mustard had been, free from the wire-worm, and producing excellent crops. Soot and lime and nitrate of soda are also very destructive of these insects. I have seen the effects of nitrate of soda; and although it did not kill them, all those which remained did very little damage after its application. I have observed that two stetches near the foot-path which crosses some fields of mine were infected with wire-worms; and if I had not known the cause, I should have been some time in parching it out. The fact is, there are two rows of grass which will grow up where the gravel path unites with the common soil; and as every time the field is ploughed the plough is brought as close up as possible, some of the eggs of the wire-worm, or click-beetle, which have been deposited in the grass, are thrown out, and the wire-worm thus perpetuated in these stetches; if we go further away into the field we don't find the land infected by them. This seems to be in accordance with what I have already stated, that if you get rid of the grass, you will get rid of the wire-worm. There are several other things which destroy them besides those which I have mentioned; the liquor from gas tar is a very good thing, but then it cannot be employed to any considerable extent. Spirits of turpentine applied to any description of insect will destroy it. You may immerse the eggs of these insects in spirits of wine, and they shall lose none of their vital principle; but if they be immersed in spirits of turpentine, they will be destroyed directly. The common moth is a very destructive insect, but his ravages may be entirely prevented by a little turpentine. You have nothing to do but to place shallow boxes in your drawers, with a little spirit of turpentine in them; and as the turpentine evaporates and penetrates the cloth, the larvæ will protrude, and be found dead on the surface. This is a point well worth knowing, for which I am indebted to that highly intelligent and scientific person, Dr. M'Lean, of Colchester. There is another kind of moth, of a very destructive character, which infests the corn in our granaries. It remains quiet during the day, but flies about at night. It deposits its egg upon the wheat; a little maggot is produced, which eats into the ear, and then spins a little web over it; and when the purchaser thinks it is fully ripe, he discovers that all the inside has been eaten out. These are to be got rid of by the same process as that which I have described regarding the woollen moth. Nothing but spirits of turpentine will effect this, and there is no objection whatever to its use as it all evaporates; if you were to immerse your coat in it, it would all evaporate in a certain time; it may be applied without the slightest injury to the texture of the cloth. The next object to which I shall direct your attention is the aphis, or plant louse, and perhaps this is as well known an insect to the agriculturist as any, with the exception of the wire-worm, which does so much injury to the growing crops. The manner in which they appear is quite startling. I have watched them very closely for a great number of years. I have been very attentive to their first appearance on the field crops; but notwithstanding all my watching, I never could discover one which was not full grown. They are always found in pairs. When I have first discovered them, I have seen them in pairs and full grown, and on the following day they will produce young ones in abundance, but all apparently full-grown insects. They are oviparous and viviparous; their production is amazingly rapid. Bonnet, a French naturalist, says they produce nine generations in seven days. I have seen fields of peas so covered with them as to be completely destroyed. My pea crops were entirely destroyed by them last year, and are likely to share the same fate this year; in five or six fields they are visible on the plants, from those in full flower to those which have just emerged from the ground. I have never seen them so plentiful as they are this year upon the roses, and every other description of vegetable and leguminous plants, especially beans. When they infect beans they are sometimes black and sometimes green; when black they are commonly called 'colliers.' I think it is an erroneous opinion that they assume the colour of the particular plant upon which they feed, as stated by some naturalists. For I have seen them both green and black upon beans, at the same time; and green in some portions of the field, and black in others. It appears that there is only one male produced at the beginning of the season, and that all the succeeding classes are females, and go on producing without any further impregnation from the male. This is stated on the authority of Bonnet, who stands high as a naturalist, and Kirby confirms it. It is very astonishing how insects are produced; there are indeed some points connected with their production which we cannot at all fathom. They appear upon plants and under certain states of atmosphere in a manner so as to leave us in perfect ignorance of the manner in which they are first produced. The pea lice are so tender that they can hardly be touched without being destroyed, and that they carry their existence through the season is not reasonable to suppose. They never appear except when a north-east wind is blowing; after a warm north-east wind they appear in large numbers. They are destroyed in vast quantities by the sparrow, a bird which in other respects is itself very injurious. On one occasion, when I had observed a great number of sparrows, and at first thought they were taking the wheat, I found they were after the pea lice. The common wood pigeon is also very fond of them, and destroys them in considerable numbers; it will first eat the pea, then the stalk, and then the insect, making us a sort of compensation for eating the peas, by afterwards killing the insect (*a laugh*). The earth-flea beetle, or turnip fly, is another description of insect which is very destructive. They differ considerably from other beetles, and are remarkable for the extraordinary leaps they make. In proportion to their size they jump as far as the kangaroo. Of the natural history of this little beetle, although one of the most destructive of insects, less perhaps is known than of almost any other. In winter they live under the leaves and stems of plants, or in the chinks of walls; but naturalists do not know even the precise shape of the larva, or when and how it is produced. It is rather remarkable that this point should not be settled. We farmers do not know where they come from, or how they are generated, although we have ample proof of their destructive propensities in the injury they do in extracting the juice of the turnip. They are very fond of all the brassica tribe, such as turnips, carrots, radishes, &c., which, as well as the cabbage tribe, and sainfoin, clover, flax, &c., they generally attack. They are very fond of warm and sunshiny weather; if the weather be showery, or the crops be in a shady situation, there is not much to fear from the attacks of these insects. But in situations exposed to the heat of the sun, like our fields, they at once proceed to attack the plant, and in a very few days it will be utterly destroyed. I have observed a smaller kind of beetle upon the hollyhock, which eats it away exactly as the turnip-fly beetle destroys the turnip. It is not the same insect, although it resembles it very nearly. I have observed that they attack cabbages and cabbage plants, exactly as the turnip fly does turnips. The only mode of effectually combating the ravages of the turnip fly is to make the land so good that the turnips will grow so fast as to render it difficult for the flies to accomplish their purpose. It is with them as with us: If dinner were provided for twelve, and twenty-four came to partake of it, there would not be much left; but if, on the other hand, dinner were provided for twelve, and only six came, there would be plenty left. It is the wisest way to sow a large quantity of seed in alternate rows, at different times. For as these insects appear to like the youngest best, you may thus save one row at the expense of another. On this principle some people drill Swedish turnips in between the wheat, for the game to feed upon, although it is difficult to know what quantity will be required. The best mode of getting rid of these insects is by a very simple process; I am quite satisfied that there is no method so good as the application of common road dust, which should be strewed with the hand upon the rows of plants, early in the morning, when the dew is upon them. It will be found that they will not touch any of those plants upon which the dust has fallen. The same object may be accomplished, to a great extent, by hoeing; if you hoe land upon which you are growing turnips, you will rarely find that the plant will be attacked by the fly, so repugnant to them is the dust which gets on the leaves (*hear, hear*). Those which are the most dirty will be the surest to escape. The plant may be saved by the application of common road dust when no other means can be resorted to. I have found it answer very well with early broccoli. Another method resorted to by gardeners is the application of an infusion of elder or wormwood; if the young plants be immersed in an infusion of this kind before being planted out, no insect will touch them, as they dislike both exceedingly. There is another insect which is exceedingly injurious to the farmer, and that is the wheat midge. Long before I ever had a thought of the establishment of farmers' clubs, I turned my attention to this subject; at that time I published some letters in the original *Farmers' Journal* upon it, giving the results of my investigations into the injury effected by this insect. It would be almost a work of supererogation to repeat those results; but there are one or two points which are not gone into in those letters, particularly as to the particular time at which the injury is effected. The insect generally attacks the wheat just as it is bursting into ear, by means of its ovipositor. The egg, which is placed just between the wheat and the chaff, is converted into a reddish yellow maggot; and this maggot eats the pollen, and prevents the wheat from coming into blossom; and the time at which this is effected is generally between four o'clock in the afternoon and sunset in a summer evening. Windy or cold weather will prevent this from taking place. The insect has an orange yellow body, the wings are perfectly clear and transparent and rather long, and the antennæ are hairy and articulated. The larvæ jump upon being touched, and they are converted into the pupa state at the beginning of harvest. I have known the early wheat affected by them, and the later escape, or *vice versâ.* This depends upon the particular period of the season at which the flies come into existence. I cannot say much—indeed I cannot say anything as to the means by which the injury sustained from this insect can be prevented. It seems almost impossible over a large extent of country to apply any means which would be efficacious. Sometimes burning weeds to windward of the field infected will be of advantage. The cause of their doing so much mischief at one time and not at another is, doubtless, dependent upon certain states and conditions of the atmosphere. It seems also that they cannot effect their object unless the wheat is in a still position, or almost motionless; if the weather be windy they cannot effect their object at all. To say that wheat is frequently injured to the extent of 40 per cent. by these insects is speaking quite within the mark. Wherever the maggot has destroyed the pollen the plant will not flower or fructify, and the consequence is that no wheat is produced. Notwithstanding, however, the fact that these insects are so difficult to get rid of by any means of our own, nature seems to have devised a means for checking their increase. For the ichneumon fly is severely destructive to them; and of the ichneumon fly there appears to be about 500 different species, which are very destructive to other insects, especially to the wheat midge and caterpillar. I have frequently observed these small black flies, or "nidgets," as we call them in Essex, at their work of destruction. They will insert themselves between the wheat and the chaff, and immediately attack the wheat midge. They are very voracious, and will strike maggot after maggot in rapid succession as fast as they can pass from one to another. In passing up a field one day, on my way to market, I saw a number of these black flies on an ear of corn which I plucked, and upon examination of it, by opening the chaff, I found they attacked the wheat midge most voraciously. I carried it to market, and examined it again when I got there; but their voracity continued just the same. In striking the maggots, they insert an egg in its body; and the maggot then gets into a place of concealment, and dies, just as sheep seek concealment when suffering in a similar way. The little insect, which becomes the ichneumon, subsequently emerges from the dead insect: it is first formed into a chrysalis, and becomes a fly the following summer. I had a number of these insects, which I had intended to bring with me; but they escaped my memory. They attack caterpillars by hundreds, and seem so determined in their endeavours to effect their object, that the more you attempt to frighten them away, the more bold they become. It is to this class of flies that we are so much indebted for ridding us of the pest—the wheat-midge. The next insect which kills other insects of a mischievous character, to which I shall direct your attention, is the *spix spirifex*. It frequently forms a hole in the path, resembling a small funnel, which it constructs of sand, and cements into a firm consistency. Having completed this excavation, it deposits its egg, and upon it drops a caterpillar; then drops another egg, and deposits another caterpillar, and so on until the end. As soon as the eggs come into existence, they find the caterpillar to live upon until they come into the pupa state. I state this on the authority of Kirby, the naturalist; and all his investigations are made with so much care and assiduity that there is no doubt whatever of the fact. The habits of all these little insects, as far as we are able to look into their economy, are far before those of large animals. They appear to have a peculiar character and peculiar senses, in which larger animals do not participate. I recollect an anecdote which is told by Franklin, of the American ants which he found when he first went to the United States, which destroyed all his sugar. He accordingly suspended the sugar-pot by three strings from a nail in the ceiling, and all went on very well for a short time. But he soon discovered a line of ants going up the wall, along the ceiling, and down the strings into the sugar-pot. It immediately occurred to him that he must have left an ant or two in the basin when he hung it up, and that a communication had by these been made to the others. The next time he hung it up, he took great care that there were none, and all went on very well. He then intentionally, and for the sake of experiment, put two or three of the insects into the sugar, and hung it up as before. As soon as they had themselves had as much sugar as they could, a communication was again made, and the ants were seen in considerable numbers, running up the wall, along the ceiling, and down the strings into the sugar-pot, as before *(Hear, and a laugh)*. There could be no doubt that a communication had been made. I have myself observed a similar thing occur with a lime-tree in my garden, which was decaying, and partially covered with honey-dew; there the ants walked in a regular line to the tree. No mark was visible to the human eye, but there might be marks as intelligible and as plain to them as a turnpike-road is to us. The subject is one of such interest and vast variety that it would, if enlarged upon, not occupy one evening only, but a twelvemonth. The Hessian fly is an insect which is exceedingly destructive to the corn crops in Germany and North America, and is much less visible than the wheat midge. It is very small and slender, hardly so large as a common gnat; the breast is yellow, the abdomen of a brownish colour, and the legs of a golden yellow. It deposits its eggs in the month of June in the sheaf of the leaf, nearest the root and stem, or at the crown of the root. They there form into maggots, and proceed up the inside of the stem, and get at the wheat. The damage done afterwards becomes visible; the ear assumes a blighted appearance, and the head hangs down. Whenever you see the ears turn white and become empty, you may be sure that this fly has been at them by making its way up in the manner which I have described. And this very destructive insect is the common earwig; it is so well known that it is hardly worth while to enter into any details respecting it; and I believe the only way of getting rid of them is to catch them and kill them. Indeed, that is the best mode in most cases: it is astonishing what may be done in this way by setting a few hands to work, whereas you may make use of a variety of means, such as lime water, &c., without any effect. If you mean really to tackle them, set a few pairs of hands to work, pick them off the plants, and get rid of them by pouring boiling water upon them. I know of no other effectual method; and I have known some people spend a vast deal of money in endeavouring to get rid of the insects by a variety of other means. I shall now, gentlemen, conclude the few observations I had to make by stating that I think this a subject, the investigation of which is not only very useful, but also exceedingly delightful *(hear, hear)*. The investigation of the natural history of insects is quite equal to any other science in point of interest, and in my opinion infinitely more so than botany, because the habits of insects are so exceedingly curious. Kirby thinks they possess certain senses which we do not; in fact, seven senses are attributed to them, whereas we have but five. It is a very singular fact that, if you place a female moth in a room at night, in the morning you will find a male moth there too. It will come down the chimney, or get in by some means or other; how it should discover that the female moth is there we know not; but so it is. With regard to the glow-worm it is the female only that shines, and the light which she gives out guides the male to the spot where she is. One summer's evening as I and some friends were sitting regaling ourselves with a cigar in an arbour, an insect struck against a light which was placed there for the cigars, and fell to the ground; presently another struck in the same manner; and on examination we found they were two male glow-worms, which had, doubtlessly, been attracted by the light, evidently confirming the opinion that the light of the female glow-worm is given to guide the male to the spot where she is. There are many circumstances connected with the generation of insects which are not only exceedingly curious, but are altogether inexplicable. Some astonishing discoveries were made by Mr. Cross, who produced insects from certain poisonous substances, under circumstances which in other instances would have been destructive of the vital principle in living beings. That we should get insects from the decomposition of vegetable and animal substances is very wonderful; if we take paste, and allow it to decompose, we shall find animalcules of a comparatively imperfect formation; examine them again, and we shall find them more perfect. So in the case of the grub changing to the chrysalis, and the latter to the perfect fly. The common cockchafer is five years before it arrives at a perfect state, and is undergoing changes the whole time; and when it becomes perfect it only lives for a few weeks. The subject of the generation of life is one of the deepest interest, and I find it touched upon so ably by an author who endeavours to get rid of the opinion that no creation of life can take place which did not originally take place, that I do not think I can do better than conclude by reading a passage from his work. He says:—'A candid consideration of all these circumstances can scarcely fail to introduce into our minds a somewhat different idea of organic creation from what has hitherto been generally entertained. That God created animated beings, as well as the terraqueous theatre of their being, is a fact so powerfully evidenced, and so universally received, that I at once take it for granted. But in the particulars of this so highly supported idea we surely have cause for some re-consideration. In what way was the creation of animated beings effected? The ordinary notion may, I think, be not unjustly described as this—that the Almighty produces the progenitors of all existing species by some sort of personal or immediate exertion. But how does this notion comport with what we have seen with the gradual advance of species from the humblest to the highest? How can we suppose an immediate exertion of this creative power at one time to produce zoophites, another time to add a few marine mollusks, another to bring in one or two conchises, again to produce crustaceous fishes, again perfect fishes, and so on to the end? This would surely be to take a very mean view of the creative power; to, in short, anthropomorphize it, or reduce it to some such character as that borne by the ordinary proceedings of mankind. And yet this would be unavoidable; for that the organic creation was thus progressive through a long space of time rests on evidence which nothing can overturn or gainsay. Some other idea must then be come to with regard to *the mode* in which the Divine Author proceeded in the organic creation. Let us seek in the history of the earth's formation for a new suggestion on this point. We have seen powerful evidence that the construction of this globe and its associates, and inferentially that of all the other globes of space, was the result not of any immediate or personal exertion on the part of the deity, but of natural laws which are expressions of his will. What is to hinder our supposing that the organic creation is also the result of natural laws, which are in like manner an expression of his will? More than this, the fact of the cosmical arrangements being an effect of natural law is a powerful argument for the organic arrangements being so likewise, for how can we suppose that the august Being who brought all these countless worlds into form by the simple establishment of a natural principle flowing from his mind, was to interfere personally and specially on every occasion when a new shell-fish or reptile was to be ushered into existence on one of these worlds? Surely this idea is too ridiculous to be for a moment entertained' *(Hear, hear).*"

Mr. Nesbit.—I will just offer a few remarks upon one or two portions of the very interesting subject which you have introduced to us this evening. I think that although it must be granted that it would certainly seem that insects do attack plants in an apparently healthy state, I am of opinion in almost all cases the plants are in a diseased state before they have the power of attacking them. The same remarks apply to the fungi which we observe on diseased plants or decaying trees. With respect to the turnip-fly, a friend of mine, a farmer in Norfolk, makes a practice of ploughing-in five weeks before sowing, and he finds the invariable result is that the turnips are not attacked: this has been the case for the last twelve years.

Mr. Fisher Hobbs.—Do you mean that the *last* ploughing should be five weeks before the sowing?

Mr. Nesbit.—Yes; he says he has tried the plan, and found it succeed during the last twelve years. He gives a reason for it which I do not; he says that they find nothing to exist upon, and that consequently they die. The case you mentioned, Mr. Chairman, respecting the lime-tree covered with honey dew, which was attacked by the insects, is, I think, another proof that they only attack diseased plants. Then, with respect to the observations about Mr. Cross and his alleged creation of insects, I beg to say that Mr. Cross never did create an insect by galvanic power: he imagined at the time that he did; but he has acknowledged since that he did not. Doctor Warwick at once pointed out what the insect was which he thought he had created. It was, in fact, the wandering mite which was discovered two hundred years before. We know, and have abundant evidence in geology, that there have been times when certain animals did not exist, and that at subsequent times they did exist. But I wholly deny the doctrine set forth in the book from which you have read an extract ("The

Vestiges of the Natural History of Creation"), and which I look upon as very unphilosophical, of a sliding from one species to another. We know that Lamarque entertained the opinion that man had sprung from the monkey, and the latter from the mollusk. Mr. Lisle told Lamarque that, if he searched a little further, he might, perhaps, discover that he had an ape for an ancestor. I contend that there never was a species discovered to have been newly-created; that we have not found them before is because we have not looked for them. The eggs of some insects are so exceedingly minute, that we may carry them about with us without being aware of it, and wherever they find the elements of their existence, there they will come to life. If there be the elements necessary to their existence, they live; if there are not, they die. With regard to the fly in hops and other plants, I am quite sure, from what I have seen, that they are attacked for want of something which in their healthy state strengthens them. I have seen the plants on one side of the garden attacked, and not on the other. Those which were strong and healthy were not touched, while the others were. It seems evident from this, that there must be something in the former which rendered them capable of resisting the insect. It cannot depend upon the state of the atmosphere merely, or all would equally be affected (*Hear, hear.*)

The Chairman: I did not intend to mention the name of the book from which I read the extract, had you not done so; and I should rather not enter into any discussion upon the points raised by the author of that work; the portion, however, which I selected so nearly expressed my own sentiments, that I thought I could not do better than read it. I quite agree with you, Mr. Nesbit, that insects attack diseased plants in preference to healthy ones.

Mr. Nesbit: My opinion is that it is impossible for these insects to come in any great quantities upon plants which are not diseased. Corrosive sublimate, I believe, is a very good thing to destroy them, if you can only apply it.

A Member of the Club expressed the great gratification which he experienced at the very able manner in which Mr. Baker (their Chairman) had brought forward this subject, one which was equally interesting and important to old and young. He could not help feeling surprised that they did not see among them a greater number of young gentlemen.

Mr. Nesbit also expressed himself much gratified with Mr. Baker's lecture, and dwelt upon the importance of entomology to the agriculturist.

The Chairman returned thanks for the expressions of approbation to which those gentlemen had given utterance. Nothing would deter him from attending the meetings of this club for the discussion of such subjects; by using their faculties in the investigation of such matters, they not only conferred a benefit on themselves, but upon their whole class. If men would only look attentively into that which they saw and knew, and communicated more frequently with each other in this way, society would advance much faster than it did at present (*hear, hear*). But, unfortunately, the agricultural classes seldom met, and seldom discussed subjects of this description. Any one who entered into such studies would experience the greatest delight; the proper way to pursue them was to get a good leading work as a text-book; and not to be contented with reading merely, but to examine and compare the insects for themselves. This would do a great deal more than reading only (*cheers*). He hoped what had passed to-night would induce others to enter upon a subject from which he had himself derived a vast deal of pleasure. He did not pretend to any great amount of science, but having turned his attention to such subjects in early life, he found it easy to brush up a little now (*cheers*).

After a short further conversation the meeting separated.

ON THE CULTIVATION OF THE SOIL FOR THE GROWTH OF ALL KINDS OF ROOTS.

DORKING FARMERS' CLUB.—APRIL MEETING.

There were present about 40 of the best agriculturists of the district. Lee Stere Esq., Chairman, Mr. R. Weller, vice Chairman, Mr. Page, Secretary, C. Barclay, Esq., E. Kerric Esq., — Turvill Esq., Mr. Bothwell, Mr. Wilson, and Mr. Curtis.

After reading the minutes of last meeting, Mr. Curtis, at the request of the chairman promised to give the secretary the substance of his address given last month, to be placed on the records.

Mr. Page then rose and gave the following talented address " On the cultivation of the soil for the growth of all kinds of roots." After regretting that the subject had not fallen into older and abler hands, he stated that he brought the subject forward himself, because he thought it the duty of the members to render all the assistance they could, according to their abilities. All were individually interested and all should lend their exertions to the common cause (*Hear, hear*). It might perhaps seem that he had not, in speaking of the cultivation of soil, chosen a term sufficiently comprehensive but he must request them to consider it in its most enlarged sense; as the cultivation of the soil for the growth of roots must necessarily include every operation connected therewith, from the time the fallow was commenced in the autumn, until the roots themselves have arrived at maturity, he should endeavour to make such cursory remarks as his own experience and observations suggested; and he trusted they would receive them as emanating from a plain farmer, actuated by a desire to benefit those of his own occupation *(Hear, hear)*. It would be superfluous to expatiate on the advantages of good roots, every farmer knew their value. It was however, a curious fact, and one which did not reflect much credit on farmers as a class, that till within the last two or three years how very slow they had been, in adopting any alteration that might facilitate their growth. Happily for them (the farmers) a better state of things was beginning to exist. Prejudice—the twin brother of ignorance—was fast disappearing before the light of science, and an advancement in the scale of knowledge was indicated by many circumstances; and more particularly by the establishment of farmers' clubs. With the farmer on light soils his success or failure in his root-crop must even determine his failure or success as a farmer. An indifferent root-crop is almost invariably followed by a bad crop of barley and a thin layer of seeds, and as a necessary consequence an ordinary crop of wheat; while the ground is left in a miserable state for the succeeding course—and, however poor a soil, it will never remain idle, if corn cannot grow, weeds will, the consequence was they had less corn to sell, less hay and straw to carry to the homestead, and at the same time less muck to carry back to the soil. It was obvious, therefore, that a good root-crop could hardly be too dearly purchased. In considering the subject, he would make first a few general observations on root culture, and then extend his remarks in detail to each particular kind. The preparatory operations should commence in the autumn, as soon as the corn crops are cleared; and at this time it behoves the farmer to adopt such means, and use such implements as will most speedily effect this purpose. Every day, every hour is of the utmost value, for the winter's rain may set in and stop his proceedings. They had now many implements in use, such as Biddle's scarifier, the Uley cultivator, Finlayson's harrow, and the extirpatory harrow. He had used two of them, but not comparatively, and it would be therefore unjust in him to give a preference. The use of these implements is far better and quicker than the old methods of ridding the soil of couch and seeds. But there was another system, viz., the use of the fork by manual labour. He believed that to be the cheapest method of any, particularly where the land is not excessively foul. The farmers of Norfolk, use this system exclusively, and judging from the appearance of their crops it had the desired effect. If it were not the cheapest, the Norfolk farmers would not use it, as they are quite as sensibly alive to having the balance the right side of the sheet as any other. This was verified by the remark of one of these farmers to him (Mr. Page). Speaking of the many new methods springing up, he said the first question he asked before adopting any, was, will it pay? or, is there any probability of its doing so. He (Mr. Page) had had an opportunity of visiting that famous county, and he would say, if any person wanted to see the cultivation of roots, carried on in first-rate manner, he should go there in the month of September. Besides, if cleaning the land by manual labour were only as cheap as any other method, it ought to have the preference, as it furnished means of employment to our increasing population. Where a farmer can substitute manual labour for that of the horse, he benefits himself in the end, to the same extent as he confers a benefit on the community. A sufficiency of manual labour judiciously employed, was, he believed, a most essential thing in good farming, and yet he had known things half done, others done out of season; and others totally neglected, in order that as few labourers as possible should be employed. He had known intances of 12s. a week paid to the labourer, while four horses have been kept at an expence of not less than £35 a year, to do that work which two might have done with the greatest ease—and this by persons of by no means a niggardly turn—such is the force of habit (*Hear*). The ground then being properly cleaned from all weeds, he (Mr. Page) would recommend that the land should be ridged up for the winter, and at the last ploughing if the subsoil plough or pulverizer were brought into action, it would be attended with good effect. By ridging up the ground a greater area of surface is exposed to the influence of the winter's frost and rain, while in the spring the land becomes dry at an earlier period than when left flat.—He was further persuaded that one of the greatest secrets of success in the production of good root crops, was, that they should be as forward as the nature of the soil and the season would permit. The farmer has so many opposing circumstances to contend with, that to lay down any decided rule would be impossible, but, he was fully persuaded, that considering all this, the earliest farmer in the main, would be found the most successful. (*Hear.*) The first kind of root which claimed the attention of the farmer, in the spring of the year, was the white or Belgium carrot, introduced he believed six years ago by Sir Charles Burrell, who, last year; according to his own statement, had grown 1,600 bushels per acre, on a very moderate soil, of the Wealden clay. He (Mr. Page) also grew at the Holmwood, 1,200 bushels per acre. The soil was first trenched 24 inches deep, at a cost of 1s. per rod, and when the land was dry, the seed was deposited by the Suffolk drill, at seven intervals of seven inches: which is by far too short. The seed was well rubbed through the hand, and then 5lbs. was mixed with 4lbs. of dry ashes or sand, being the quantity for 1 acre. In its early stages the carrot was of slow growth, but it was astonishing what progress was effected when once a start was made. In Norfolk they are grown in the following manner:—The land is cleared and ridged up for the winter. In the spring, dressing is applied, and the ridge split back. Two rows are then deposited on the crown of each ridge, at nine inches apart, while to the crown of the ridge on either side, is 18 inches, making 27 inches for two rows. The reason they give is, they are enabled by this method, to use the horse hoe at a late period without bruising the plants. It is said that farm-yard manure applied immediately before the seed is deposited, makes the roots fibrous, and to send out lateral shoots. He had not observed this, it might however, be the best way to dress in the autumn. Mr. Page then shewed, that by using this root, a saving would be effected in a team of four horses of 12s. a week, or £12 for five months in the winter. He had given them also to bullocks with the most satisfactory results. They would grow on any land too stiff for turnips, or in fact, any root except parsnips. According to analysis, 266 lbs. of carrots contain as great an amount of nutriment as 350 lbs. of Swedish turnips, or 460 lbs. of beet-root, or 200 lbs. of potatoes, or 600 lbs. of cabbage, any one of which is considered equal to 100 lbs. of good meadow hay. He next alluded to parsnips, as it would bear sowing in the autumn, a more certain plant he thought might be relied on. He might be able to speak of the comparative value of this root at a future period as it was their intention to attempt the growth of them this year. He would pass over potatoes, as so much had lately been said about them in connection with the disease, and come to mangel wurzel. Mr. Barclay's farms are conducted pretty much on the four-course system, but instead of sowing all our barley stubbles to clover, a portion is set apart for mangel wurzel. The corn being cleared, then in the autumn we apply ten cart loads of muck per acre, which is spread abroad and ploughed in, using at the same time the subsoil plough. In the spring, the land is harrowed down or scarified as the case may be, and the ground again ridged up, the crowns being 27 inches apart. The subsoil plough is then used between every ridge, and ten additional loads of muck per acre applied. Persons are employed to spread the manure as evenly as possible all along the ridges. The Northumberland breast plough follows, splitting the ridges, and covering the manure directly over the portion which has been subsoiled. A light roller is passed over the ridges, and the drill follows, depositing 5 lbs. of seed per acre, 3 cwt. of guano, and 15 bushels of wood or turf ashes, or a mixture of both per acre; a light roller is again run over the ridges, to press the soil firmly about the seed, and the process as far as it relates to the planting is complete. If the Scotch ridge drill be used, the rolling will be dispensed with, as the whole of this will be performed by that implement at the same time. As soon as weeds appear, the horse hoe should be used, and continued at intervals, till the plant gets too large to have it used without injury. As soon as the plants are strong enough, they are singled out from 12 to 14 inches apart in the rows by women and boys; men follow, using the hoe across the ridge, taking care to draw the earth away from the roots. It is prejudicial to the growth of all roots to earth them up, or in any way to cover them with the soil, while in a growing state. Should any want of plant occur, as there will, even in the propitious season, we take advantage of a showery day to transplant such as the case may require. During the last year thev used Read's subsoil plough, or pulverizer, moving the soil to the depth of 12 inches from the surface. They grew at Helmwood 22 tons of roots per acre, topped and tailed, and this with the land very much out of cultivation. As to the kind, the long yellow is to be preferred; it produces the greatest and most certain crops, and is said to contain the greatest quantity of saccharine matter. If it be remarked that the process he had related was an expensive one; he would ask what kind of crop could be obtained without an outlay? (*Hear.*) He would now consider the preparatory culture for turnips. This root was perhaps, after all, the most valuable for agricultural purposes; and when they considered that five times the land was sown with them than all other kinds of roots put together, it ought surely to engage their serious attention. Some persons, on light soils, sowed rye in the autumn, and fed it off before planting turnips. He believed as much was lost as gained by this method, as there was barely time to prepare the land properly for their reception. They did not apply any dressing in the autumn for their turnips, as they could not spare it. In all other respects the preparatory process was the same as that for mangel wurzel. A gentleman, in Norfolk, told him of the following novel method of dressing in the autumn for mangel wurzel or Swedes. On his wheat stubble he carried out a certain quantity of straw, and spread over the surface of the soil; he then conveyed one half of his turnip crop thither, folding the land evenly with the sheep and consuming the roots thereon. He was assured that it was a more economical method than the manufacturing it in the yard, and at the same time the land was solidified by the sheep. It was to be borne in mind that his land was of a light nature. In the Spring after ploughing as much as possible, 10 loads of muck may be applied and ploughed in shallow. The drill follows, depositing the seed, and at the same time some description of artificial manure, the intervals between the roots being 18 inches. Some would contend, this distance was too short; but he had noticed that, when departing from an old rule or practice, they were prone to run into the other extreme. If 12 inches were too near, 30 might be too far; and it was a question of doubt if 3 Swedes of moderate size and of the same weight as 2 larger ones, were not to be preferred to them. Mr. Page then alluded to the alteration in the agricultural system, which had been made within the last few years, by the use of these fertilizers—the artificial manures—particularly guano. Luxuriant crops of corn and roots were now seen were before, comparatively, nothing grew; and where the land was hilly as well as poor, (as was the case in a large portion of the county of Surrey), almost inaccessible to the muck cart, a powerful and cheap fertilizer like guano was invaluable. Mr. Page then alluded to the vast increase which had taken place in the consumption of guano. It appeared that from the 1st of July, 1844, and the first of July, 1845, 137,303 tons of guano were used in this country, costing the British farmer a million and a quarter of money. An astonishing fact, and one that would appear incredible, were it not that the returns of the quantity imported, placed it beyond a doubt. A million and a quarter of money thus applied to the land, cannot have produced less than double that amount worth of food. Mr. Page then read some remarks from the *Agricultural Gazette* on the increasing consumption of manure; and afterwards proceeded to say that the best period of time for sowing turnips was that between the 20th of May and the 20th of June, the nearer to the former day the better. Some soils were liable to mildew, but not those in that district, even in these cases early sowing was preferable, as it afforded an opportunity of a remedy, if the first sowing should fail. Their practice for Swedes has been to drill mixed with 15 bushels of wood or turf ashes, 3 cwt. per acre of guano, sifted and broken finely, this was necessary, as unless the greatest care was taken to keep the seed and manure from coming in actual contact; and unless manure itself be finely subdivided the fermentation would destroy the germinating properties, of the seed. He was persuaded that the failures which had attended the use of artificial manure was owing, for the most part, to inattention in these particulars. Last year he made an experiment of applying, on a small portion of land, guano, at the rate of 5 cwt. an acre, broad-cast. At the outset this took the lead, but when the roots arrived at maturity, it was hardly superior to the 3 cwt. The speaker then referred to another kind of manure of longer standing than guano, namely, bones; upon which manure it was considered that not less than one-third of the turnip crop in England was dependent. The constituent parts of bone, were fat, jelly, and phosphate of lime.—Now, it was not known at first in what proportion these individual component parts assisted the growth of the turnips. To ascertain this, bones were boiled before they were applied to the land, in order to extract the fatty matter. The absence of this was not found to affect the productive qualities of the bones. Then, in order to get rid of all but the phosphate of lime, burnt bones (as an experiment) were applied. On most soils the absence of the gelatinern as well as the fatty matter of the bones, was not found to impair their quality as manure. By these experiments it was pretty clearly established that the value of bones, as a manure, was to be found in the presence of phosphate of lime. Mr. Page concluded his address by detailing the experiments of several eminent agriculturists on bones as a manure.

Some conversation then arose as to the comparative expense of cultivating turnips with the various artificial manures now in vogue, and the production consequent thereon. After which,

Mr. **Barclay** rose, and spoke of the improvement which had taken place in the cultivation of Swedes. In the younger part of his life, when he was more of a sportsman than he was now, he remembered when he could not bear to see a field of Swedish turnips, because it afforded such a bare cover, the plants were hardly up to their feet, since then so great an improvement had been made, that they were now considered the best places for sportsman. One method to improve the growth of mangel wurzel, and Swedes, was to give the cottager an opportunity of growing them in his garden, for the sake of producing the seed. The seed was not only improved by this plan, but it afforded an advantage to the cottagers, some of whom he had known to receive two or three pounds per annum, nearly one-third of their rent for their seed. He then dwelt on the manifest advantage to be derived from the use of the fork in the production of all agricultural roots, as alluded to by Mr. Page. He (Mr. Barclay) had had two men out of Kent for the purpose of teaching his labourers "forking."

It was much used now in Norfolk, where in many instances they produced 45 to 50 tons an acre. With regard to bone manure, it was first used in the north, where enormous quantities were now consumed. He had a little farm in Suffolk, where on one occasion, some time ago, they were completely run out for muck. The subject of bones recurred to him, and he asked his bailiff if he could get any. The bailiff made inquiries, and found he could get any quantity he wanted. They were shipping them at Yarmouth for the North. He got some bones, and applied them with great success. He had had lately a rather ridiculous instance of the assistance bones were to grass lands. His servants had been in the habit of giving bones to the dogs, on the lawn. He had remarked little places where the grass was higher than on the lawn generally, and on inquiry, he found they were where the dogs had been in the habit of picking the bones thrown out to them. (*Hear.*) He would now leave the subject for some one else.

Mr. TURVILL rose and said, he should like to ask Mr. Page a question or two relative to the culture of mangel wurzel; he understood Mr. Page to say that he applied ten loads of dung per acre in the autumn to the land to be planted, and in the spring another ten loads, besides guano.—Now, could Mr. Page furnish them with the expence? The dung alone would amount to £6 per acre, and the subsoil ploughing at the time of planting he (Mr. T.) did not approve of, and mangel thrived best in a firm soil. He (Mr. Turvill) would now state the manner in which he raised his crop of last year. In the harvest of 1844, he removed a very heavy crop of wheat and straw; he then immediately ploughed the land three times, and between the last ploughings put on eight loads of dung per acre, the soil being a very heavy sandy loam. It was laid in lands 12 feet wide.—In the beginning of May, he (Mr. T.) well pulverized the soil by means of a scarifier and drag harrow, five or six inches deep—he then sowed 16 bushels bones, broad-cast, and 2 cwt. of African guano per acre, well harrowed in; that quantity of bones he considered unnecessary, for that crop of mangel wurzel, as not more than from 40 to 60 lbs. of phosphoric acid would be removed by the crop, which could be supplied by twice that weight of bones, they being potash plants.—He then drilled in 4 lbs. of seed per acre, at 3 feet distance. When they had arrived at the height of 12 inches, 4 cwt. of chloride of sodium was applied (common salt) per acre, and well stirred into the soil by means of a horse hoe. Two lands in the field being left unsown, to test the value of this constituent, which was very visible through their growth. When the crop was weighed off, it produced 31½ tons, without the salt, and 34½ with, giving an increase of 3 tons per acre, with the salt, which cost 5s. per acre. It is necessary to mention that the salt was sown from a seed-lip between the rows, to prevent its getting to the heart of the plant. The object should be to grow as large an amount of crop, at the least expence, and by looking to the ash of the plant, the facts can only be ascertained. If 100 lbs. of turnips were removed from the field, we should discover 90 lbs. of water, the remaining ten pounds would produce 1 lb. of ashes when burnt; the other nine pounds being organic, would go away to the atmosphere, to be again assimilated by the plants—and the contents of the ash must be applied to the soil, in their fair and equal proportions as they are there discovered. It was his (Mr. Turvill's) opinion that farmers should not try, what is called experiments, by giving the plant only one portion of its food at a time—It is like giving a man his meal—the bread without the meat, or the meat without the bread. By chance, the deficient constituent might be applied to the soil: then of course the effect would be good, and might induce the supposition that a correct principle had been established; but, on using the same constituent again for a future crop, we might find no visible effect; as probably a sufficiency of the previous constituent had been left in the soil, which had been instanced on Mr. Drewitt's farm at Bramley, with the potash and soda.—Although it might be deposited in a portion of the farm, it being principally a straw growing material would be returned to the yard, and carried back in the dung to another part of the farm, and in process of time it would get over the whole farm, and thus a very small quantity imparted afterwards would supply the waste.—The farmer must look to the great self-acting law of nature, and assist her, or he will not be able to succeed. We never hear of a farmer trying experiments with good made dung,—and why? Because it contains all the elements of the plants; therefore, when we have not dung, we should supply all the elements that it contains—for after all, the plants are the best chemist—they will take their equivalents of food, if present, and if not, we cannot expect them to be developed.

Mr. PAGE was not at that moment prepared to answer the question about the cost for the cultivation of his mangel wurzel. Of course the expence of the dressings was easily calculated, but the labour would require some time to estimate. He would go into the calculation, and let them know on a future occasion.

The CHAIRMAN, in allusion to some remarks made by Mr. Turvill instituted some inquiries as to the constituent part of Swedes, when

Mr. TURVILL replied, that Liebig did not appear to have given the analysis of Swedes.

The chairman then read a letter, which appeared in one of the agricultural journals, written by a gentleman who had made some successful experiments in growing Swedish turnips on a piece of the most stubborn land possible—being a part of, or near the tract of country, known by the name of Cranbourne Chace. The land, indeed, was of such an unyielding nature, that the labourers were not able to use the spade, but were obliged to dig it with a pickaxe. This gentleman cultivated it with guano and ashes, which were dibbled into holes, and then the seed was dropped in. The experiment was very successful. The quantity grown was 23¾ tons an acre, producing a profit of something like £15 an acre, after deducting the costs of dressing and labour.

Mr. **Bothwell**, in alluding to the practice of using lime in the preparation of the land for roots, said that its nature and properties were often mistaken by farmers. It was not really a manure: its utility consisted chiefly in its destructive qualities. It destroyed the insects that were enemies to the roots; and at the same time pulverized the soil to a certain extent.

Mr. **Turvill** said that lime did not supply any growing matter: it was rather of an exhausting nature. If they wanted to run their farms out, they should use plenty of lime.

Mr. **Weller** said he would say a few words with respect to what Mr. Page had said about mangel wurzel. His plan might be very well for persons with capital at their command, but no other would be able to cultivate in that way. Even these capitalists, he (Mr. Weller) thought, might pay too dear for their whistle. He confessed he had not a very good opinion of mangel wurzel; he would rather have a bushel of Swedes than of mangel wurzel. The latter was of a too watery a nature for farm-yard feed. It made the stock loose. He regarded a good rick of Swedish turnips as almost salvation to a farmer. It was returned to him doubly, through the farm-yard manure it made. Nor did Swedes require an expensive dressing. He knew a gentleman who grew them at the rate of 1400 bushels per acre. His dressing was 10 loads of dung, 2 cwt. of nitrate of soda, and 3 cwt. of guano, sown broad cast. To this quantity of dressing, he (Mr. Weller) had added 25 bushels of ashes drilled in. He regarded wood ashes as of great importance in the Wealdish district. As to what had been said about lime, he thought it was a capital thing on Wealdish soils, such as his (Mr. Weller's) farm consisted of. It was often applied by farmers at the wrong time of the year, which rendered it less efficacious than it otherwise would be.

Mr. **Curtis** expressed a regret, that Mr. Page had passed over potatoes in his admirable remarks. He (Mr. C.) thought that every investigation that could be made, should be made into that useful root. It was an old saying, that it was an "ill wind which blew no one good." It appeared, that although the disease of the potato crop of last year, was productive of much loss and inconvenience, yet it had been productive of some good, for it had turned the attention of persons to the peculiar character, and the constituent parts of the potato; and chemists, it was said, by their examination of the root, had discovered in it a new acid, the existence of which they had not before known, or had an idea of. While speaking upon the subject of potatoes, he would name that a friend of his had been conducting some experiments in the planting of potatoes. He had planted whole potatoes, in the same soil, and at the same time as pieces consisting only of a single eye. He found contrary to what had before been remarked, that the single eyes produced the larger crop, although it was longer arriving at maturity.

After a few words from Mr. J. Dewdney on rough saltpetre as a manure, the chairman announced that the time had arrived for closing the consideration of the subject.

Mr. **Turvill** suggested the propriety of employing a gentleman to give them a lecture on agricultural chemistry.

The club then adjourned till Tuesday, May 12th.

After the proceedings had concluded, Mr. Dewdney introduced his friend, Mr. Loder, who interested the meeting by exhibiting the process invented by Mr. Paine, for hardening timber and rendering it incombustible.

TENANT-RIGHT.

In Madeira there is very little change respecting tenants, and every inducement is given for encouraging the tenant, which is not in vain, as generally the island may be said to be tilled on the most approved plan for producing the greatest quantity. In every district there are valuers appointed, who, in case of removal, value what the incoming tenant has to pay, and they proceed in a two-fold plan. If the landlord takes possession, then the valuers give the outgoing tenant what they consider the full value for all improvements in buildings and land; but should the tenant be followed by another tenant, then two-thirds only of the value is paid by the incoming tenant. Then, again, while the tenant is allowed to make all improvement he pleases, yet it guards the landlord by not allowing him to give up the land without providing another tenant; and the outgoing tenant is bound to find a third, unless the landlord accepts either of the two first; but if he refuses them, he is bound to accept the third, otherwise a tenant might lay out a very great sum in building and other improvements (as he might call them), and make his landlord pay the full value; this plan is well adapted to protect both landlord and tenant.

NORTON FARMERS' CLUB.

MONTHLY MEETING.

Mr. **Robert Linley**, of Bolehill, in the chair. The meeting was well attended. Captain Woolhouse, of Norton; Mr. Tennant, Hill-top; Mr. Joseph Gillott, Ryecroft; Mr. Wm. Taylor, Mr. G. Osborne, and Mr. Wm. Hancock, of Dore, were unanimously elected members of the Club.

THE CULTIVATION OF POTATOES.

Mr. **Rogers**, the Secretary, then read some remarks on the disease in the potato crop, and the mode of planting and preserving the crop. He noticed the universality of the disease in Europe and in America, and the difficulty of accounting for its origin. The opinion that it arose from the wetness and coldness of the last summer, seemed probable, so far as Europe was concerned, but across the Atlantic, the season had been hot and dry, yet, there also the disease had raged. Some had attributed the disease to the use of guano, but it was only in England that guano had been extensively used, and this, of course, could not account for the disease on the continent and in the United States. Mr. Rogers said, my own experience induces me to think well of guano; and I have heard of an instance where considerable quantities of it were used in growing potatoes last year, and where not the slightest appearance of the disease showed itself. A question which it is of the utmost importance to ascertain is, what kinds of potatoes are most affected by the disease. In the report laid before the American legislature, by a committee appointed to inquire into the origin of what is called the potato murrain, a great number of the individuals examined, stated that the disease was found to be most virulent in the *oldest* varieties of potatoes, and that those most recently raised from seed were comparatively free from it. It is exceedingly important to ascertain whether this is a fact in this country also. It is much to be regretted that so little is known of the different varieties of potatoes grown in different parts of the country, and that the same varieties are often known in different districts by different names. I hope the different eminent agricultural societies will more seriously turn their attention to this matter; if so, it is possible that they may collect a sufficient number of facts to serve as a safe guide for the future cultivation of the root. Without some such an investigation as this, I no not see how facts can be collected sufficiently general and well ascertained to serve as a safe guide for the practical cultivator. I can speak with some confidence, however, respecting the kinds of potatoes grown by myself. Last year, I planted three sorts, namely, Regents, Reds, and a kind called Mundays (the seed of which I obtained from the neighbourhood of Chesterfield). The first and last named were the least affected with the disease when dug from the ground; and their condition, subsequently, has proved the best. Perhaps not more than *one* peck in thirty or forty of the Regents and Mundays, were affected to any extent; while the Reds (the seed of which had been in the neighbourhood for several years), were not only deficient in yield, but where more of less affected with the complaint. Having quoted some remarks by Mr. Herapath the celebrated chemist, on the appearance of the disease in potatoes when stored; and from Dr. Duncan, on the necessity of renewing the seed potatoes by tubers derived from seed, Mr. Rogers said—Whether the disease of last year is really new, or whether it is an old disease, showing itself with unusual violence under ciicumstances unusually unfavourable to all kinds of vegetable life, is another point which it would be very desirable to ascertain. If the disease in the United Kingdom and on the continent, is the same as the American, then there is nothing new about it, as we are told it has existed for several years in the United States; and though I am not prepared to speak with any confidence on the subject, yet I am inclined to think it has existed more or less in England for several years. One thing I am quite certain of, that the potato has been very liable to disease of one kind or other in this country for the last seven or eight years, during which time there has scarcely been a season in which large quantities have not either perished in the spring, or been found more or less decayed when taken up in the autumn. I have the best authority for stating that, about three years ago, extensive fields of potatoes grown in Lancashire were very little better when taken up than the diseased crops were last season. If it could be satisfactorily ascertained whether the diseases which at that time prevailed amongst the potato crops, are, or are not, the same as that prevalent now, we might then probably be able to form some judgment as to the best mode of getting rid of it, as it would enable us to conclude whether it springs from accidental and temporary causes, or is the result of some deeply-rooted and permanent defect in the plant, or the ground in which it is grown. Mr. Rogers next quoted the consular returns as to the state of the potato crop in various parts of Europe, and the information he had derived by personal enquiry among many of his neighbours as to the state of their crops. He thus stated the result of his cultivation—For the last eight years, I have been a potato grower. My efforts, however, have seldom been attended with particular success, except during the last two or three seasons; and I attribute my improved crops solely to an improved system of planting, &c. Up to the year 1843, I simply prepared and tilled the ground intended for potatoes after the prevailing fashion of the neighbourhood, and planted the potatoes in the month of May. I entertained an opinion, that all that was requisite to ensure a crop, was to plough the ground, draw trenches, and put in plenty of manure; but this too popular fallacy was dispelled by one failure after another, and I felt a difficulty how to act, till I consulted a work on chemistry, wherein the preparation and nature of the soils for the cultivation of this valuable root were pointed out. An application of salt and lime appeared to be wanting to supply some absent constituents of the soil. I accordingly tried them, and the experiment was crowned with success. I think potatoes cannot be planted too early, if the danger of frost be over. They must not be planted too close, and much will depend upon the soil being repeatedly pulverized by the hoe. I would recommend the ground intended for planting being ploughed or trenched with the spade, as *deeply* as possible during the autumn, and another ploughing and harrowing in the spring. The complete pulverization of the soil is indispensable. The land should then be ploughed into furrows or drills, three feet apart, and the manure spread evenly in the bottom of the drills, and the seed, *uncut*, planted on the top of the manure, at ten inches asunder. I would then draw the soil lightly over the whole, and allow the ground to remain undisturbed till the stems of the plants have grown three or four inches. In this stage, the horse-hoe (an excellent implement I have occasionally seen exhibited in our Corn-exchange), is then to be repeatedly used between the rows, and the weeds between the plants either abstracted with a small hoe or with the hand alone, or with both occasionally. The soil is next to be gathered round the roots and stems of the plants as often as may be found necessary. When the roots have spread through the earth, neither the hoe nor the plough should be used, and all weeds must be carefully taken out with the hand. If you apply the two implements in this stage, there will be great danger of injuring the roots. When the stalks are in blossom, great service would be rendered to the roots, if the flower is pulled off. I would also strongly recommend all weeds being taken to a heap, and mixed with salt, or liquid from a manure tank, which, after laying and being turned at intervals, will form an excellent tillage hereafter. The salt and liquid, combined, will entirely destroy all vitality in the weed, so that there need be no apprehension of mischief being done by its application as a fertilizer at some future time. If care be taken to pulverise the soil and clear away all weeds, the ground will have the same advantages as if it had experienced a dead fallow, and at the same time yield a valuable crop.

The foregoing is the system I have adopted with success. I plant as soon in April as the weather and state of the ground will permit. I reap in October, always arranging, in the best way I can, to dig up the crop when the weather is dry. Last year, comparatively few diseased roots were discovered on reaping. I had them pitted in heaps of moderate size, and afterwards sorted at least five or six times, with intervals of a week or a fortnight. About twenty loads were also spread on a chamber floor, and after remaining till they were thoroughly dry, they were then covered with straw during winter. When uncovered, the potatoes in the chamber were in a less growing state than those in the pits out of doors, and very few bad ones were met with.

[Mr. Rogers here showed a fair sample of the potatoes which he grew last season. They were examined by the Chairman and members, and considered to be excellent. Some, about the size of an hen's egg, were recommended for seed. When a fine dish of cooked ones was introduced, some little merriment was created by a member suggesting a *rump-steak,* as an accompaniment.]

Mr. LITTLEWOOD had suffered his crop to remain in the ground all winter, and he shewed a few which he had gathered that day. They appeared firm and untainted with disease, but where generally small in size.

In answer to a question,

Mr. ROGERS detailed the manner in which he prepared lime, salt, &c., for tillage, which he described as being extremely beneficial in the growth of potatoes on his and other land of a similar nature.

Mr. BOOKER and Mr. VEALE confirmed the report which had been given as to the state of their crops. Mr. Booker said, the disease had not been confined to the old sets exclusively on his father's farm. They had planted, among other kinds, early and second Shaws. The former, when taken up in September, were good both in appearance and quality; but the produce of about an acre, which had been saved for seed, was now found to be as much affected with the disease as any other kind. When the second Shaws were reaped, they were affected at the time, and have continued so since. The red potatoes had kept the worst. All the Shaws for seed were purchased at a distance last year. He thought their loss had been from one-third to one-fourth.

Mr. HAZARD and other members detailed similar results in their respective crops.

Mr. THOMAS LINLEY, of Cowmouth, had been more fortunate than many of his neighbours. He grew last year, a peculiar kind of second early kidney potato, which had not only proved an abundant cropper, but had also happily escaped the effects of the disease.

Mr. ROGERS was glad Mr. Linley had kept the kidneys for seed, since none could be better in quality, and it would give others an opportunity of procuring them for that purpose.

After other remarks,

The CHAIRMAN complimented the reader of the paper, for the information which had been given, and proposed a vote of thanks to Mr. Rogers.

A long and animated discussion then followed on the important subject of "Tenant-rights," in which Mr. John Greaves, land valuer, &c., of Bradway, and Mr. R. Booker, jun., took an active part. The former strongly advocated the existing system, as being fair and equitable between landlord and tenant; and the latter as strongly denounced it, as being unreasonable and one-sided. The Chairman, Mr. Thomas Linley, Mr. James Veale, Mr. Wm. Linley, Mr. Rogers, and others joined in the conversation, which was brought to a close, with the understanding that Mr. Greaves will give a paper on the subject, at the meeting in June.—Sheffield and Rotherham Independent.

ST. PETER'S FARMERS' CLUB.

FIFTH ANNUAL REPORT.

The return of our annual meeting admonishes your Secretaries of their duty to present your Report; and we shall proceed to the discharge of this duty, relying on your ability, assisted by our worthy President, to correct our errors and supply our deficiences, so that it may go forth as a correct record of your sentiments, and secure its measure of public approbation.

We shall select from the many topics discussed at our monthly meetings such as appear to us to be of the greatest general importance; and shall give the opinions of the Club on these subjects in the most consecutive form, consistent with their amplitude.

First, we shall proceed to record your opinions on the subject of "Tenants' rights."

1. You all agree that every possible arrangement should be made to secure good farming. Even moderate rents cannot be paid without it: the heavy expenses of the tenant can be met under no other system: the rapid increase of our population renders it desirable; and it will secure the employment of the agricultural poor.

2. It is not likely that the capital and skill of the agriculturist, and the capabilities of the soil, will be fully developed unless due attention is paid to the relative position of landlords and tenants.

3. Security of possession is most important to every occupier of land. Improvement in the condition of the soil is, to the farmer, what improved machinery is to the manufacturer; nor can there exist proper inducements to the necessary outlay, in either case, unless a fair chance is given of obtaining adequate remuneration. A farmer, under any circumstances, risks his outlay; and he has many dangers and difficulties to contend with, unfelt and unknown to mercantile men; but uncertainty of tenure (an evil too often inflicted on the tenant by those whose interests are involved in his success) places him at once in circumstances infinitely disadvantageous, and will be sure to operate on every reasonable mind in the production of a parsimony incompatible with the best interests of the landlord, the labourer, and the country. On these grounds leases are desirable.

4. If farms are taken on a yearly tenure, the tenant should receive two years' notice to quit, that he may have proper time to seek another home; and care should be taken in the agreement that the landlord is not left with a starved farm, nor the occupant without a fair remuneration for his outlay. Matters should be fairly adjusted too between outgoing and in-coming tenants.

The following plan is considered likely to secure the interests of all parties concerned:—

> 1. That the outgoing tenant be paid for all work done on the land after his last harvest.
>
> 2. That all fodder, straw, and manure found on the farm at Michaelmas, be taken by the in-coming tenant at its full value.

3. That half the value of manures applied the preceding year be paid to the out-going tenant.

4. That all buildings erected by the tenant, or purchased by him of his predecessor, be taken by his successor.

Lastly, That the real value of all their items be settled by fair arbitration.

5. It might prove advantageous to both parties if landlords were to pay the out-going tenants the full amount of the valuation, and take it from the in-coming tenants in yearly or half-yearly payments, so as to reimburse themselves, both principal and interest, by the expiration of the term specified in the lease or agreement. It often happens that the tenant (though an industrious and persevering man, possessing a good degree of practical knowledge) having to pay a large sum on entering a farm, is so straitened as to be unable to improve the estate; still he would be able to do so, and also to pay an increased amount annually for the benefit received, if assisted in his commencement. This plan would give accommodation to tenants, and prove a good investment for landlords—increasing the real value of their estates, while it improved their rent-roll.

6. It is hoped that all parties concerned will discover the mutual advantages of judicious arrangements, and cordially co-operate to establish a sound system of "tenants' rights." Wise voluntary arrangements are better than acts of parliament; still some legislative interference seems required to meet cases where persons, in the possession of farms, are not protected by any agreement with their landlords relating to the treatment they are to receive on quitting, but are left to the "custom of the country." A legal standard of appeal would be useful in such cases: now, the tenant must take just what the landlord pleases to give him, or enter a contest in which he is unequally matched; and the very ground on which the battle must be fought is unstable as a floating iceberg.

Resolved, "That the sentiments entertained by this club, on the subject of "tenants' rights," be forwarded to the London Farmers' Club, in compliance with the request of that club, and that the subject be resumed here at some future period, at the discretion of our president."

We proceed next to report your discussion on the "Comparative Advantages and Disadvantages of Farming Highly, Moderately, and Parsimoniously."

It appears impossible to come to any decisions on this important subject which will equally apply to all localities, or to farmers prosecuting their calling under widely differing circumstances. In order to fairly balance the advantages of high farming with the advantages of other systems, men must be supposed to possess fixity of tenure, or a certainty of remuneration for the improved state of cultivation to which the land is brought under their management. It is often said, in the present day, that a want of capital is the great hindrance to agricultural improvement, but where men possess fixity of tenure they find no more difficulty in obtaining capital than persons do engaged in trade, or prosecuting the duties of a profession.

In order to fairly test the comparative advantages of the systems, it is also necessary to suppose that labour in each case can be commanded at a moderate price, and manure obtained with equal facilities. Further, in making the comparison it must be remembered that all farmers are subjected to seasons in common with each other; that the household expenses, and the seed corn required, are about the same whether a man farms highly or not; that rents, tithes, parochial rates, and income-tax fall equally on each; and that the prices realized for that portion of the produce taken to market are similar. There may be some difference of opinion amongst us as to the classification of farms under the three heads, but this is of no consequence to the discussion, because our remarks on the comparative advantages will be equally applicable, however we may, in our own ideas, classify the lands to which they apply.

There is no question but high farming is most advantageous to *the nation.* We cannot move a step in improvement without extra labour: whether we purchase manure, or make it on the farm by consuming green crops and artificial food, additional labour is required in proportion to the extent to which the system is carried; and carting, turning, and spreading the manure increases labour: when it is buried in the soil it will produce weeds, and these must be uprooted, or a great portion of the benefit will be lost. Then, if all goes on well, the crops will be more abundant, and will require more labour to harvest and store; there will be more thatching, more thrashing, and a larger quantity of produce to take to market; so that it is easy to perceive that, in a thickly populated country like ours, the employment it furnishes over and above that furnished by other systems, proves its advantages in a national point of view. We may also conclude that, as the improvement of land may be carried on to a great extent if it is managed skilfully, and when it has been farmed well for many years it will produce amazing crops; if, therefore, this system of high farming was generally adopted it would render this country entirely independent of other countries for its supply of food.

The members of this club, however, do not for a moment flatter themselves that the farmers of England are so full of patriotism and benevolence as to generally adopt the system of high farming, unless they can be satisfied it will prove productive of *personal advantage*. The probability of this is always required to propel the wheels of agricultural machinery in an onward movement.

There are probably but few persons who farm *parsimoniously* or *drivingly* from choice, while many do so from necessity. The advantages peculiar to it are few and small: but little capital is required, which is an advantage, if this little will only answer all desirable ends, and as the expectations of such farmers can never run high, the appearances of their crops are seldom flattering, and are often little affected by blight or heavy rains—some mortifications are escaped. But these advantages are more than counterbalanced by the serious consequences attending the system. This driving is always in the wrong direction; the capabilities of the soil are gradually diminished; the capital employed is perpetually lessening; and the probability is, that such a farmer must soon reap his last crop, which will little more than meet the demands of the landlord, who would not have let his farm to such a tenant had not the law given him prior claim to all other creditors.

There are also advantages and disadvantages peculiar to what is termed farming *moderately*. Here everything is carried on systematically and regularly. The crops are in rotation; the seasons for the several sorts of grain follow each other; the movements of the men are orderly and regular; and the cattle are never put out of their paces, nor subjected to the least possible inconvenience. The moderate farmer is generally quite satisfied with the knowledge he possesses: he toils not at science: he loses nothing in speculations or experiments; and his farm is a snug little settlement so long as prices answer his purpose. But if the value of corn is much depreciated, such a farmer (from utter incapacity to increase his quantity under this system, and having scarcely anything but corn to sell,) is placed in an awkward predicament: his prosperity is destroyed by the ruthless hand of changeful legislation: even a general adoption of the system of high farming would prove his ruin, and he is left like a duck-legged drummer boy, unable to keep up with his regiment, hobbling and grumbling in the rear.

The man who farms highly also finds advantages and disadvantages attending his system. That the amount of produce will be much increased by good cultivation no one can doubt; and as many standing expences are the same as under other systems, and the prices of manure and labour are in some measure regulated by the price of this produce, we conclude that the value of the increased produce will usually be more than sufficient to reimburse the farmer for his increased outlay. Still very much depends on the prices obtained for the increased produce, and no farmer is likely to keep on in his outlay to effect improvements, unless he finds the capital he has invested is returning interest, and he can hopefully anticipate that the permanent improvements will again put him in possession of the principal.

In no country that we know of, much less in a country taxed as is England, can any system of farming produce food cheap enough to satisfy avaricious manufacturers on the one hand, or penniless idlers on the other; yet properly protected by the legislature, with fixity of tenure and at moderate rents, and smiled upon by Divine Providence, we believe the increased amount of produce obtained by men who farm highly will enable them to sell at prices that could not be endured under any other system to which we have referred.

Another advantage of high farming is that it perfects in every locality the productions of the country.

A good cultivated farm, even in this bleak neighbourhood, will produce anything and everything that can be produced by field culture in England. A man's chances are thus multiplied; and the season must be peculiarly unfavourable if he has not a few fields which return him very considerably over the average value of crops.

This system also gives ample scope to the mental energies of the farmer; and if mental exercise increases mental power; if "activity is the soul of happiness;" this may be considered an advantage.

There are too some disadvantages to which the man who farms in this way is sometimes subjected. If he happens to lose a crop, the loss is not trifling; if seasons are precarious he is put to serious inconvenience by the disarrangement of his operations, and if there is a general depreciation in the value of agricultural produce his loss is immense.

Considering impartially the advantages and disadvantages of the three systems, we give our verdict in favour of high farming, believing it to be the only system to which we can hopefully cling in the present day, and most likely to prove profitable for several years in succession, while it perpetually improves the land; and we regret exceedingly that the uncertainty of tenure to which some of us are subjected, together with the uncertain value of agricultural produce, arising from fickle and whimsical legislation, prevents its more general adoption.

Another topic that urged itself upon the attention of the club was "The injustice that would be perpetrated upon agriculturists if the duty on foreign produce was reduced, without at the same time making a corresponding reduction in the claims of the tithe owners."

At a time when agriculturists are likely to feel the effects of the repeal of a law that gave them some protection, that placed the foreigner in his proper position, made him to feel that he was alien, and that if he did not contribute by a duty to the necessities of a state from which he was withdrawing its capital, he should not be allowed to enter into competition with her sons. At such a crisis, it behoves the farmer to weigh well the causes that render it a hardship for him to enter into this unequal competition.

Independent of a weight of taxation (greater than nearly all the countries of Europe together), borne both by agriculturists and manufacturers, it is the direct burden of the former to provide for the clergy of the establishment. The conduct of the bulk of the clergy during the discussion of these measures by Parliament has been of the most apathetic kind: they have maintained, as it were, an almost unbroken silence upon this momentous question. But what might not the result have been had they have risen as one man, and headed the agriculturists in their efforts against the free-trade league? If they do advocate the principles of the League, common honesty ought to prevent their receiving protection rate tithes. It really seems astounding that men of principle can be so blinded by mammon as not to see that an act of parliament cannot wash away the sin of extortion. They should bear in mind that "example is better than precept." Besides a very large proportion of the tithes are in the hands of the lay impropriator, who often, far from caring for our souls, has very little concern for our circumstances, and will let his tithes by tender to the person who will offer the largest sum, irrespective of his creed, be he protestant or catholic.

It was admitted that the Tithe Commutation Act was of great use to the farmer, stimulating him to a free use of his capital in purchasing manure, &c., &c., and thereby providing additional food for the country; and that in this particular locality no dissatisfaction was expressed relative to the collection of the tithes; still it must be recollected that the Tithe Commutation Act passed first, taking the averages at seven years, and that since then one great alteration has been made in the protective duties (and another is threatened) which has had the effect of reducing the price of agricultural produce, and still government has brought forward no measure for altering the mode of taking the averages, by reducing the seven years to a shorter period: an act of injustice has thus been committed that is complained of by the members of this club; and they are now brought to think, however reluctantly, that the clergy would have bestirred themselves, and have helped them had they not have been rendered quiescent by the assurance that the low price of farming produce would be some years in affecting them, and when that period arrives some reaction may have taken place in the opinions and conduct of our legislators relative to free trade.

The absurdity of the League assertion—that corn will not be cheaper after these alterations, cannot be better shown than by carrying out the question to its full extent. If corn is not to be cheaper, of what use is the repeal of the duty; what can be the utility of raising a ferment in the country, the termination of which cannot be clearly seen? If corn is to be at the same price, what a glorious extra profit we shall be putting in the pockets of the foreigner, and what a further amount of taxation we shall have to endure to make up this deficiency.

In 1844, there was imported into this country 1,100,361 qrs. of wheat, and deduct the re-exported therefrom 46,109 qrs., and we find that 1,054,252 qrs. were liberated at an average of 19s. per qr. duty, making upwards of a million of pounds duty paid upon wheat alone, independent of other grain. The tithes upon that quantity, at the rate of 5s. per qr., would have realized £250,360 to the clergy of this kingdom, had it been of home growth. Thus it will be seen that the foreigner is free from an impost that weighs heavily on the British farmer, and if the duty is entirely removed, will have greatly the advantage.

The tithe alone on corn is, in many instances, equal to the short freights. Oats in March last being sent from Hanover to Liverpool, at 3s. per qr.—(*See Mark Lane Express*).

The club, after much discussion, came to the resolution—"That it is the opinion of this club that whatever alteration is made in the price of corn by the alterations in the protective duties, the tithes should be correspondingly and proportionably altered at once, not waiting till the seven years' average shall effect it; and that the tithe question be recommended to the consideration of other farmers' clubs, in order that some grand effort may be made to effect so just, and at the same time so desirable an object."

FARMERS' CLUB.—The meeting of the Peterborough Farmers' and Graziers' Club was held at the Board-room, Westgate, on Wednesday, the 3rd instant; Mr. James Webster, in the chair. An interesting discussion took place relative to the management of turnip crops; and a resolution was passed that it was the opinion of the meeting that the turnips should be sown on the flat, that the land should be ploughed deep and drained early in the spring, and ploughed as little as possible afterwards; and that it is desirable to use sulphuric acid and bones as a cheap and efficient manure for turnips.

THE BURDENS ON REAL PROPERTY.

REPORT FROM THE SELECT COMMITTEE.

The following is the report of the Committee by the Lords Committees appointed a Select Committee to inquire into Burdens on Real Property, and the impediments to agricultural transactions, caused by the system of Excise duties, poor laws, and local taxation; and also to inquire and to report on the legislative exemptions and pecuniary advantages provided by law in respect to taxation as affecting landed property:—

Ordered to report, that the committee have met, and considered the matter to them referred, and have examined several witnesses in relation thereto, and have agreed to the following report:—

The committee have thought it expedient to divide the subject into two heads, viz., "Restrictions upon Cultivation," and "Positive Charges," both being imposed for the general advantage, and not for the special benefit of that class upon which they exclusively or mainly fall.

Under the first head it appears to the committee that they should include the prohibition to grow tobacco, and the restriction on the use of malt for agricultural purposes, in consequence of the heavy duty imposed upon it.

The tenant farmers lay great stress on the malt duty, and its injurious interference with the cultivation of barley. The committee, however, cannot consider that impost, which, on the average of the last ten years, has produced very nearly 5,000,000*l*. annually, as borne exclusively by the land; beer being almost a necessary of life with the mass of the population, the duty falls as a general tax on the consumers of the article; but it is unquestionable that so heavy a duty diminishes the demand, and deprives of a ready market all except the best qualities of barley. A duty of 21s. 8d. on a quarter of barley costing 34s. is so heavy a tax, that Mr. Barclay is of opinion that no brewer can afford to buy inferior barley and make it into malt. The agricultural witnesses examined before the committee complain loudly of the restriction the Excise laws impose on malting inferior barleys for fattening purposes. The advantages of this process having been matter of dispute between learned chemists and practical farmers, the committee will content themselves by referring to the evidence of Mr. Hudson, of Castleacre, Mr. Bennet, &c., on this subject, and adding, that if further experiments should establish the utility of the process, the malt duty must be considered as a serious obstruction to agricultural economy.

The committee consider the malt and other Excise duties rather as restrictions on cultivation, and as impediments to the improvement of land, than as exclusive charges on real property. The duty on hops amounted in 1844 to 288,526*l*.; the duty on British sugars to 7,052*l*.; the duty on bricks to 435,735*l*.

The committee have no means of ascertaining the exact amount of injury inflicted on real property by the Excise laws; they cannot, however, but conclude from the evidence before them, that the repeal of the malt duty would considerably increase the demand for barley; and that the removal of the duty on bricks would not only tend to the more rapid improvement of real property in towns and their vicinity, but, what is still more important, add to the comforts of the poorer classes by improving the character of their habitations.

The committee have attempted, under the second head, to ascertain the extent of the various charges to which real property is subject, and to place them under the consideration of the house.

It is evident that every compulsory charge levied upon the land, and which becomes payable out of its proceeds before any portion of them is available or applicable to the profits of the capital vested in it, must be held to affect that capital.

If such charges are of a magnitude to reduce the value of the net produce of the land below the average profits of capital, such capital would, in accordance with general principles, be withdrawn from the cultivation of the soil, to be diverted into some other channel. It is, however, universally admitted that this general principle is in some degree disturbed by the preference given to some occupations over others. The cultivation of land will attract capital at a lower rate of interest than most other occupations: the rate of remunerating profit is consequently smaller, and it would, in proportion, be sooner exhausted by extraordinary burthens.

In estimating the amount of the burthens to which real property is subject, the committee have not deemed it necessary to attempt to draw a distinction between the owner and occupier of the soil, as representing separate interests. In many parts of the country they are actually identical, the owners cultivating their own property. Letting land to capitalists, instead of the owner cultivating it himself, is only a different mode of management; and all charges levied upon the land, whether paid by owner or occupier, reduce the net profits of their joint capital invested in the cultivation of it. The capitalist hires the use of the land, and of the buildings necessary for the cultivation of it, as an instrument by which he may turn his capital to profit; and the price he offers is regulated by the liabilities he incurs in the employment of such an instrument. When those liabilities are easily ascertained, the capitalist can precisely calculate the consequent reduction in the amount he would otherwise pay for the use of the soil; but in cases where the charges fluctuate, and an approximation to their amount can alone be made, he subjects himself to the variation of those charges during the term of his occupation. When these direct and indirect charges equal in amount the profit remaining after the expenses of management and interest of capital have been deducted, the capitalist is no longer able to pay for the hire of the instrument with which he employs his capital.

The land-tax, in the opinion of the committee, is a burden upon the land, inasmuch as it must be deducted from the gross proceeds of the land before its net product can become available as profits of capital. The temporary act of the 4th of William and Mary imposed a rate of 4s. in the pound on land, hereditaments, tenements, offices, and pensions, and 24s. per 100*l.* on personal estates; but in the subsequent annual acts the rate varies from 4s. to 1s. in the pound on lands, hereditaments, &c. The 38th of George III. fixed the quota payable by each county, city, and borough, and directed the commissioners under the act to charge the several divisions in proportion to the sums assessed thereon by the temporary act of William and Mary. Although the quotas are fixed, in reference to each district, by the act of George III., the law admits a variation in the allotment of the sum amongst the different owners of property within the district, and redemptions continue in consequence; although except for the purpose of insurance against an increased rate on approved property, the privilege of redemption is, at the present price of the funds, nearly a dead letter. This tax is most unequal in its pressure; and, from the statement put in by Mr. Wood, it appears that the quotas are higher in proportion to the value of property in the purely agricultural counties than in the mining and manufacturing districts. According to the latest returns, the land-tax unredeemed amounts to the sum of 1,164,042*l.* The amount of land-tax which has been redeemed no longer appears as a burden upon land; but it must not be forgotten that the proprietors of land, in order to escape from the operation of the tax, have paid over to the state an amount of capital of which the sum redeemed represents the annual interest, and of which the state is still deriving the advantage.

The poor-rate, including the county-rate, amounted in 1844 to 6,847,205*l.* That amount is the return of actual payments; but the evidence accompanying this report is pregnant with proof that the employment of unprofitable labour would constitute an important addition to such returns. In order to reduce the poor-rate, the farmers in many parishes employ more hands than the economical working of the land requires. Mr. Robert Smith explains this system; and Mr. Baker estimates this additional outlay on his farm at 3*l.* per week on 500 acres. The actual sum levied in the name of the poor-rate does not, therefore, correctly represent the full amount of the charge imposed upon real property by the laws regarding the maintenance of the poor. It is true that, as far as he is a ratepayer, the manufacturer may be influenced by similar motives to keep in employment for a time unprofitable hands; but the extent to which these motives operate will, of course, depend upon the relative proportion of the charges to which the respective interests are subjected.

The highway rates, exclusive of those which are at present relieved by the aid of turnpike trusts, amounted in 1839 to 1,169,891*l.* The committee feel it their duty to observe, that the ratepayers not only have not the exclusive use of the highways, but are not even allowed to limit their expenses by the repairs necessary for the conveyance of agricultural produce; inasmuch as the roads, if not in a state of repair sufficient for purposes of general traffic, may be indicted for any party using them, although such party is not liable to the highway rate.

The committee feel it their duty to direct attention to the probability of the repairs of the turnpike-roads falling eventually on real property. Mr. Baxter states that, in the neighbourhood of Doncaster, tolls are paid to the turnpike-trusts, notwithstanding the entire maintenance of the roads has fallen on the rates. Mr. Bennet also bears testimony to a rate being raised in the last year for the repairs of the Holyhead turnpike-road in his parish, amounting to an expenditure of about £10 per mile. However important may be the advantages which accrue to the landed interest from the improvement of the highways, their maintenance is not the less a positive charge or burden affecting the profits of the real property of the country.

The church-rates constitute a smaller, but still a positive charge upon real property; they amounted in 1839 to £506,812, this being the latest return.

The committee are of opinion that the tithe commutation rent-charge operates as a burden on the land which is subject to it; inasmuch as a certain amount measured in produce must be paid, whatever may be the nature of the cultivation or the return made by it. The value of the crops, without reference to the natural qualities of the soil, being taken into consideration in fixing the basis on which the commutation rests, lands which by artificial means were rendered highly productive during the seven years on which the commutation is based, have become in consequence permanently liable to a heavy rent-charge. Mr. Weall, in his evidence, states that the high farming introduced at great expense into the parishes of Beddington and Wallington had raised the tithes during the years preceding the commutation act from 3s. 6d. per acre to 7s. and 8s. per acre. Mr. Bennet remarks, that the heaviest wheat lands have the heaviest tithes upon them; thus imposing the heaviest charge where cultivation is the most expensive. Mr. Cramp says the tithes in the parish in which he resides amount to 17s. 6d. per acre; and Mr. Blamire, in answers 2,524 and 2,525, confirms the evidence of preceding witnesses, that the rent-charge amounts, in some cases, to more than one-half the rent; that one-third is not an unusual proportion, and that there are some rare cases where the rent-charge is equal in amount to the whole rent. On the supposition of a continued reduction in the amount of proceeds derived from capital invested in the cultivation of the land, it is self-evident that titheable land would be abandoned sooner than land which is tithe free; and, though the landowner has no claim whatever to the property of the titheowner, the tithe itself would in that case have the effect of diverting capital from its cultivation. The committee, therefore, submit to the consideration of the house the fact that £4,500,000, levied under the tithe commutation act, becomes payable out of the proceeds of the land before any portion of them is available or applicable to the profits of the capital invested in its cultivation. It is further important to consider the effect of this charge on the land in the case of a serious fall in the price of agricultural produce. Under the old law, the value of the tithe would correspond with that of the crop; but under the law of commutation it would take several years before the land would be relieved in the amount of its tithe.

The intensity of the pressure of a burden must be measured by the relative ability to support it; and the committee, therefore, place before the house an estimate of the rateable value of the real property on which the enumerated burdens are assessed. According to a return made to the House of Lords, the annual value of real property assessed to the poor-rate in England and Wales in the year ended Lady-day, 1841, amounted to £62,540,030. The land tax, highway, church, and poor rates, alone amounting to £9,687,950, would thus be equivalent to an income tax of about 15 per cent. on the annual value of real property in England and Wales. If to the above sum of £9,687,950 is added the tithe rent-charge not merged in the land, *i. e.* £4,500,000, making a total of £14,187,950, the contribution annually levied on real property for the public service under the five heads of tithes, land tax, poor, highway, and church rates, is equivalent to an income tax of nearly 23 per cent. on £62,540,030, the rateable value of the real property in England and Wales.

This sum, however, is probably much below the actual value of the property liable to the above-named rates. The committee believe that the returns which state the rateable value of real property in England and Wales to be £62,540,030 have been made from the rate-books; and as in some parishes property is not entered at its gross value, a certain amount must be added to the above sum before the actual value of real property in England and Wales liable to the poor rate can be obtained. The annual value of real property, as deducible from the income tax, amounts to £85,802,735 in England and Wales. The land tax, highway, church, and poor rate (including the county rate), would be equivalent to a tax above 11 per cent. on this valuation; but it should, however, be remarked, that mines, other than coal pits, manors, and fines, which are exempt from poor rate, are included in the above estimate.

The committee are aware that the above enumerated sums do not represent the whole contribution levied on real property for the public service. In some counties rates are raised under the head of bridges, lunatic asylums, and constable rates; while the land is still liable, in case of the militia being called out, to a heavy disbursement for the support of that national force. An additional charge has also been imposed on the land by the expenses of valuers and solicitors incurred under the Tithe Commutation Act. Mr. Blamire estimates the above incidental charge at an average of 2s. 1d. per acre. The committee, however, have not deemed it necessary to enumerate charges of a merely incidental and temporary nature; nor have they, from any returns made to Parliament, been able to ascertain any amount of separate rates raised in some districts in addition to the poor and county rates.

The stamp duties levied under the head of "Deeds and instruments" in 1844 amounted to £1,646,365; but a portion of this sum being derived from other sources, ought to be deducted before the burden affecting real property in that respect can be correctly estimated.

The committee, moreover, wish to direct particular attention to the important evidence given by Messrs. Senior, Stewart, and Baxter, on the unequal pressure imposed by the various stamp acts on dealing with real property. The last-named witness, Mr. Baxter, says the stamp upon a 50*l.* sale (calculating a certain length of conveyance) would amount to 12½ per cent.; on a 100*l.* sale, of 5 per cent.; on a 300*l.* to 2½ per cent.; on a 500*l.* sale to 1*l.* 14s. 3d. per 100*l.*, and above that sum 1 per cent.

The transfer, moreover, of real property is subjected by law to other difficulties, expenses, and inequalities, of a similar character. According to the evidence of the same witness, the expenses, including stamps, upon a sale of 50*l.* value, amount to no less than 30 per cent.; upon a sale of 100*l.* value, to 15 per cent.; upon a sale of 600*l.* value, to 7½ per cent.; upon 1,500*l.* 5 per cent. The committee are convinced that the marketable value of real property is seriously diminished by the tedious and expensive process attending its transfer. Nor is it only in the transfer of real property that the pressure of this burden is felt. It is a work of time to raise money on landed security, and the law expenses incident to the transaction are a considerable addition to the interest on the sum borrowed. The transfer of the debt or mortgage is also attended with serious expenses to the mortgager; the process of discharging the land from one loan, and subjecting it to another, being both heavy burdens upon the proprietor. Mr. Baxter gives the following evidence on the expenses attending mortgages:—"A mortgage for 50*l.* would cost, in stamps and law expenses, 30 per cent.; a mortgage for 100*l.* would cost 20 per cent.; a mortgage for 450*l.* would cost 7 per cent.; a mortgage for 1,500*l.* would cost 3 per cent.; a mortgage of 12,500*l.* would cost 1 per cent.; for 25,000*l.* it would cost 15s. per 100*l.*; and for 100,000*l.* it would cost 12s. per 100*l.*"

The objects for which the above restrictions and taxes are imposed are all of a public nature, and interest alike the possessor of personal property and the landowner who derives his whole income from reality. The prohibition to grow tobacco, and the restriction on the use of malt for agricultural purposes, are imposed for the protection of the revenue raised for the general purposes of the state. The stamp duties levied in connection with real property are applied to the same objects; and the direct charges which constitute the heaviest burdens on real property supply the funds applicable to the internal services of the state.

The committee observe that the annual amount of national income, as deducible from the income tax, in 1842, amounted to 244,760,580*l.*, while the real property rated to the poor rate, according to the returns made to Parliament in the same year, was 63,540,030. Thus a great portion of the administration of justice, of the maintenance of the fabric of the church, and of the internal communications of the country, as well as the entire support of the poor, are all defrayed from a taxation from which nearly three-fourths of the national income are exempted.

It is incumbent on the committee to remark, that the relative proportion of the special burdens on real property assessed upon houses and other property, as compared with land, has of late years been increasing in a progressive and rapid ratio. The committee refer to this change with pleasure, as indicating a large increase in the fixed capital of the country; and cannot doubt but that in the districts where the change has been the greatest, a material relief has been afforded to the rate payers by extending the field over which the local burdens are spread. But, although the proportion between the different classes of real property has thus been altered, the burden does not fall the less exclusively upon real as compared with personal property; and the committee feel it incumbent on them to remind the House that neither the law nor the spirit of the constitution originally contemplated so partial a system of taxation. The poor-law of Elizabeth, and the land-tax of William and Mary, embraced every description of income; but, in consequence of the comparative facility of rating visible property, and the small amount of income derived from other sources in the early period of their assessment, personalty seems to have escaped its legal share of contribution to the public service. It is necessary, however, to observe that the liability of stock in trade was continued by law to a late period; and is, up to the present day, only suspended by an annual act of exemption.

The committee have further directed their attention to the charges of a public nature from which real property has become exempt, while property other than real remains liable :—

1. *Legacy and Probate Duty.*—Freeholds are exempt from legacy and probate duty. The committee have not been able to ascertain the exact amount of legacy and probate duty paid by leasehold property; but they feel it their duty to draw attention to the fact, that leaseholds are not only liable to the stamp duties on dealings with the property *inter vivos,* but also to the probate and legacy duty. Nor can the committee avoid reminding the House that legacy duty is paid in every case where the testator has devised his lands to be sold; and, according to the evidence of Mr. Baxter, a solicitor of very great practice, nine wills out of ten in the middle ranks of life convert the whole land into personalty for the purpose of division. The evidence of Mr. Pressly tends to confirm the previous evidence of Mr. Baxter, that a considerable portion of the legacy duty is raised on freeholds devised to be sold for the purpose of division. He witnesses that Mr. Trevor, the Controller of the Legacy Duty, estimates it (the portion raised on freeholds devised to be sold) at five-twelfths of the amount. Assuming the legacy duty to be 1,200,000*l.*, he estimates the proportion of duty arising from real estate at 500,000*l.* "I think," the witness continues, "he has put it too high. I do not think that more than a fourth, or scarcely a fourth, of the 1,200,000*l.* legacy duty arises from land." The witness, however, does not include leasehold property in his calculation; which, being liable to both probate and legacy duty, must be added to the above-mentioned estimate before we arrive at the full portion of the legacy duty arising out of the proceeds of the land.

2. *Tax on Horses.*—Husbandry horses are to the farmer what machinery is to the manufacturer; and so far as the latter is exempt from taxation, to the same extent ought the former to be. The fixed machinery of the manufacturer, whether of steam, water, or other power, is rated with his buildings, for the purposes of income tax and of local taxation, on the principle of the amount of rent which would be given by a solvent tenant for their use; and the thrashing machine and other fixed machinery of the farmer is rated with his buildings and the rest of his farm on the same principle. The moveable machinery of the manufacturer and its produce are exempt from such rating, while the arable land of the farmer is rated on the improved value given to it beyond its natural value by the introduction of the plough upon it, which value would cease if the plough were withdrawn from it; and thus, by rating his property on the increased value produced by the use of his moveable machinery, the latter is indirectly, but not less effectively, taxed, as well as his fixed machinery. It has been urged, that as trade horses are liable to taxation, the absence of duty on husbandry horses constitutes a special exemption. There is, however, this difference between them, that the former cannot be considered in the light of machinery where they are not used for the purposes of production; and as the tax on the farmer's horse was, in effect, a tax upon his plough, it constituted a peculiar burden upon the machinery of the agriculturist, from which that of all other manufacturers was free; and the removal of it cannot fairly be considered as a special exemption, though in some instances, where it is retained on horses used in trade, the continuance of it may perhaps be held to be a peculiar burden on those traders. It should also be noticed, that the farmer suffers indirectly to a considerable extent by the tax on horses, inasmuch as it tends to limit the number kept, and consequently the demand for the animal, as well as for the produce of the land required for its sustenance. The committee, however, are of opinion, that the remission of the taxes on horses ridden occasionally by occupiers of farms under 500*l.* a-year, on those used by bailiffs, shepherds, &c., and on husbandry horses used occasionally for other purposes, or let occasionally to hire, estimated by Mr. Pressly, the Secretary to the Board of Stamps and Taxes, at 79,096*l.*, must be considered to constitute a special exemption.

3. *Tax on Shepherds' Dogs.*—Shepherds' dogs are exempt from the duty levied on all other dogs. This exemption, according to the same witness, is equivalent to 9,876*l.*

Fire insurance on implements of husbandry and stock must also be allowed to present a special exemption in favour of land. Mr. Pressly estimates the relief afforded by the same at 50,000*l.*

The committee do not consider the repeal of the other taxes enumerated in the table produced by Mr. Pressly as constituting special exemptions in favour of the land, inasmuch as no similar tax is continued on any other property. A special exemption from taxation implies the existence of a tax borne by all property, with the exception of one particular species of property; and, in order to establish the exemption of the land from a particular tax, the existence of this particular tax on other descriptions of property must be established. As there is no tax on artisans, labourers, and others employed in manufactories, mills, and shops, the absence of a duty on labourers employed in husbandry cannot constitute a special exemption. In the same manner as clerks, inspectors, and foremen in mills, &c., are not taxed, the absence of a tax on bailiffs and stewards forms no special exemption.

The committee place before the House, in a tabular form, the exemptions from the window duty; showing the comparative amount of such exemptions affecting the agriculturist and the tradesman:—

	£	s.	d.
Farmhouses under 200*l*. a-year	26,291	19	7
Outhouses	3,952	8	9
Total...........	30,244	8	4
Trade offices and counting-houses..	6,318	18	10
Shops	45,077	14	0
Total............	51,396	12	10
Trade	51,396	12	10
Land..........................	30,244	8	4
Balance.........	21,152	4	6

The committee need scarcely remind the House that the whole of the window duty is a tax upon real property only; and that, while farm-houses where the rent is above 200*l*. a-year are assessed to the duty, shops, trade offices, and counting-houses, whatever may be their annual value, are exempt.

The exemption of manure from tolls on turnpike roads is counterbalanced by the liability of the land to the repairs of the roads in case the funds of the trust are not found sufficient for the purpose.

From the documents before them, the committee feel pleasure in being able to state, that the exclusive burdens on real property appear to be lighter in Scotland and Ireland than in England and Wales. Under the recent Scotch Poor-law Act, as well as under the ancient law, means and substance are liable to the charge for the maintenance of the poor. If this principle were fully acted on, the burden would fall equally on every description of property; but hitherto the pressure of this charge under the law has been mainly, if not entirely, borne by the land. The teinds fall much lighter on the land in Scotland than the tithe rent-charge does on the land in England, in consequence of the teinds having been valued at a remote period, and the proprietors of the land being allowed to buy them at a reasonable rate of purchase. From the evidence, the land-tax, the building of the churches and manses, rogue-money, prison-money, repairs of bridges, commutation of statute labour on the roads, building and endowing schools, and paying schoolmasters, appear to be the chief burdens on land in Scotland. The returns made to Parliament do not enable the committee to place before the House the exact amount levied under these different heads.

In Ireland the poor-rate and county cess seem to have amounted to 1,414,850*l*.; to which must be added the rent-charge for tithes, the vestry cess for coffins for the poor, the charges under the Boards of Health, the foundling tax, and ministers' money.

The committee do not consider the large sums levied, both in town and agricultural districts, for purely local objects, as special burdens on real property, but refer to the various rates for paving, sewerage, lighting, &c., in towns, and the heavy charges for drainage, repairs of dikes, embankments of rivers, &c., in the agricultural districts, as evidence of the outlay incident to, and inseparable from the improvement of real property.

The income tax falls more heavily on land than on personalty, in consequence of the mode in which the two descriptions of property are assessed. Neither the landlord nor the tenant has any escape from the strict provisions of the law. The owner is assessed upon the gross rental, or on what the surveyor would consider a fair rent. No allowance is made for repairs, agency, or arrears; in consequence of which it results that a landlord invariably pays a per-centage to the income tax on a larger sum than his net receipts. The incomes of trades and professions, on the contrary, are generally ascertained by the voluntary declarations of the parties.

The agricultural witnesses complain also of the restriction in the choice of labourers imposed on the farmer by the law of settlement; and Mr. Coppock, the clerk of the Stockport Union, bears evidence to the hardships and expenses occasioned by the present state of that law.

The question having been raised as to the principle adopted in rating railways to the poor-rate, the committee have examined Mr. Coode and Mr. B. Russell on the subject; and it appears from their evidence that the uniform principle of assessing all fixed property at the net rent or clear amount at which it can be let has not been departed from. Railways are rated as improved land on the net rent a company of carriers would give for the occupation of the same; and, as the rents of a railway would depend materially on the profits derived from the carrying trade on it, the profits are taken as a guide to arrive at the net rent. Mills are rated on the same principle, namely, the rent for which the mill, with its appurtenances, would let. Considering the changes occasioned by the creation of real property, as well as those taking place in the relative value of different descriptions of real property, the committee need scarcely point out the advantage as well as justice of periodical and uniform valuations.

The committee earnestly request the attention of the house to the important evidence of Mr. Stewart, on the evils proceeding from the length of deeds connected with real property; and while the committee acknowledge the benefit of the act passed last session respecting satisfied outstanding terms and short deeds, they are at the same time anxious to impress on the house the necessity of a thorough revision of the whole subject of conveyancing, and the disuse of the present prolix, expensive, and vexatious system.

The committee have received evidence on the advantages of a registration of deeds in Scotland and Ireland, and on the great facilities afforded by means of similar institutions to dealings with real property in foreign states. The committee, however, limit themselves to the expression of their opinion, that a registry of title to all real property is essential to the success of any attempt to simplify the system of conveyancing.

The practical inferences which may be drawn from the evidence and from the preceding observations are very important. In some cases remedial measures, founded on sound principles and on past experience, have been suggested for evils not admitting of much doubt or controversy. In other cases, various reforms have been recommended, which are entitled to serious and immediate attention.

In conclusion, we recapitulate some of these recommendations:—

1. The improvement of the law of real property; the simplification of title, and of the forms of conveyance; the establishment of some effective system for the registration of deeds.

2. An extension of the measure of 1835, by relieving the counties and boroughs from the portion of expense to which they continue liable for criminal prosecutions, as well as the maintenance and conveyance of prisoners. This measure, however, should be accompanied by an adoption on the part of the State of an effective control.

3. The adoption of the liability of the owner of houses under the annual value of 10*l.* to the rates at which the same are assessed.

4. Where establishments exist, or may be required for the support of lunatics, and where there are obvious reasons, both of economy and of humanity, for centralising the administration, and where, above all, the resources of the State can be made available, without any risk of aggravating or increasing the evil proposed to be remedied, the committee are not prepared to justify the imposition of the whole cost upon one description of property. The committee, therefore, submit that the charge for the maintenance of pauper lunatics throughout the empire ought to be undertaken by the public.

5. To a certain extent the observations made on lunatic asylums may be applied to some branches of the expenditure for the maintenance and relief of the poor. Mr. Coode shows from official documents that the establishment charges, inclusive of salaries, amount to 17 per cent. on the total expenditure for the relief of the poor, and states that these charges might be provided for by the government, without leading to any evil consequences in the administration of the poor-law.

6. A charge is periodically cast upon the land for the militia-rate; this is not now levied, the militia being disembodied; but, considering the object of the militia to be general, and not confined to the interests of a particular class, the committee are of opinion that this charge should be provided for by parliament, care being, however, taken that if the public assume the responsibility of the charge, the government should have authority to ensure the efficiency of the force.

7. It is most desirable that the experiments for testing the process of malting barley for the purposes of fattening cattle should be repeated, with the co-operation of persons of acknowledged skill in agriculture.

These measures appear to the committee to be necessary because they are just. They have confined their recommendations of change in the sources from which certain charges should be defrayed to matters in which every interest is equally concerned, and the expense of which ought to be shared by all.

The committee considered themselves limited to an inquiry into the relative burdens on different descriptions of property within the kingdom; a more important consideration would probably be the proportion of burdens on the cultivators of land in this country as compared with those borne by the cultivators of foreign countries intended to be admitted into competition with them in the same market. On this subject some information has fallen from Messrs. Cramp and Banfield, who have been acquainted with the condition of farming in countries bordering on the Baltic and in the north of France, but the committee were of opinion their instructions precluded them from following up this description of inquiry.

The committee have directed the minutes of evidence, with an appendix and index thereto, to be laid before your Lordships.

POPULATION, TAXATION, &c.—It appears from returns just issued by order of the House of Commons that in 1801 the population of Great Britain was 10,942,646; in 1845, being 19,572,574. In 1796, the national debt amounted to 301,861,306*l.*; and in 1815, 816,311,940*l.*, at which time it was at its highest. It is now 768,789,241*l.*; the interest on the debt, funded and unfunded, being 27,827,265*l.* In 1796 it was 11,841,208*l.*, and at its highest in 1816, when it amounted to 32,938,751*l.* The poor-rates in England were, in 1803, 5,348,205*l.*; in 1818, at their highest, being 9,320,000*l.*; while, in 1844, they amounted to 6,848,717*l.* In 1838 they were only 5,186,389*l.* The number of paupers in England was, in 1813, 1,426,065; in 1843 they were 1,539,490 in number (some 110,000 more than in 1842). In 1796 the official value of exports from Great Britain to all parts, except Ireland, was 25,130,624*l.*; in 1845, it was 150,645,018*l.* The official value of imports into Great Britain from all parts, except Ireland, was, in 1796, 29,422,440*l.*; in 1845, it was 83,330,609*l.*

REMARKS ON MR. NESBIT'S ANALYSIS OF THE HOP.

TO THE EDITOR OF THE MAIDSTONE AND SOUTH-EASTERN GAZETTE.

SIR,—The accompanying letter was kindly sent to me by Mr. Lawes, on my asking his opinion as to the manure recommended by Mr. Nesbit for hops, and he has since given me permission to send it to you for publication, should you think, with me, that it contains matter well worthy the attention of all hop-growers and other agriculturists. Mr. Lawes is the best practical and experimental agricultural chemist of the present day, sparing neither trouble or expense to carry out his views by a series of careful and valuable experiments, and, as such, his opinion is of much value. At any rate, it is of value to hear both sides, and thus we are more likely to arrive at the truth. I certainly have very great confidence in Mr. Lawes, as every experiment tried at his recommendation has been with me successful.

I remain, Sir, yours' respectfully,
J. M. TYLDEN.

Milstead, April 21, 1846.

"My dear Sir,—I have much pleasure in forwarding to you my opinion upon a pamphlet, 'On the Analysis of the Hop, and the nature of the manures beneficial to its growth,' by J. C. Nesbit. It is of essential service to agriculture that correct analyses of the ashes of the cultivated plants should be made, and the author of this pamphlet deserves the thanks of those interested in the cultivation of hops, for having shown them the nature and quality of the minerals which are annually removed from the soil by that plant. But when he says that the large quantity of potash taken out of the land by the hop is the main reason for the necessity of manuring this plant so highly, he adds another to the rash theories which Liebig and his followers have been of late years advancing; and which, if true, would have quite overthrown those principles of agriculture which the accumulated experience of all ages has pronounced correct. In the ash of the hop, Mr. Nesbit found more potash than any other substance, and from this he concludes that manures are valuable in proportion to the amount of potash they contain; and he argues that as guano only contains 3 per cent. of potash, and dung about the same proportion, that farmers can supply themselves with potash from sources very much cheaper. Certainly, if potash was the essential ingredient in these manures, it would be an act of insanity to purchase it at 3s. or 4s. per lb. (which is the price it would cost in Peruvian guano), when it might be bought in the form of carbonate of potash for about 3d. per lb. As far as my own experience goes, I have never been able to find any *distinct* benefit from the application of potash to the soil in any form whatever, and the same result has been arrived at, indirectly, by agriculturists.

"Some years ago the application of nitrate of potash (saltpetre) was in very general use as a manure for grass and corn, and the benefit derived from it was said to be from the potash which it supplied to the soil; but, in a few years after, the discovery of a bed of nitrate of soda, and its being furnished at a lower price, the use of saltpetre was almost superseded; at the present day guano has taken the place of both. If potash was *the* valuable ingredient in these three substances, or so absolutely necessary to be applied to the soil, how could nitrate of soda or guano supply its place? for the first contains none, and the second often not more than 1 per cent. But when it is known that these three substances contain nitrogen, and that any of them can be replaced by an ammoniacal salt, there can be no difficulty in forming a correct opinion as to their value. If a farmer were asked which crop he considered the least exhausting to the soil, he would probably say clover; and yet this plant removes a far larger quantity of potash from the soil than the hop.

"According to Mr. Nesbit, half a ton of hops, which I suppose would be considered an average crop, removes from the soil 22 or 23 lbs. of potash, while every ton of clover hay removes 37 lbs. of the same substance; and yet it is well known that after the removal of perhaps 80 or 90 lbs. of potash in 2½ tons of clover hay, the soil is more capable of producing a good crop of corn than it was previous to the crop of clover. Mr. Nesbit gives two receipts for a manure for hops, one of which is the following:—'1 cwt. guano, 1½ cwt. common salt, 1 cwt. pearlash or silicate of potash, 1 cwt. gypsum; cost, £3 0s. 6d.' With the exception of the small quantity of organic matter in the guano, this manure is composed solely of mineral ingredients, and would be almost useless. If I thought that the return of the minerals removed by the hop would be of any service as a manure, *without organic matter*, I should be very glad to manufacture them, as they could be supplied for a few shillings per acre; but it is a very different thing to grow a good crop of anything *theoretically* in a crucible, and *practically* in a field. The most important element in a manure for hops, as well as the most expensive, has not been mentioned by Mr. Nesbit. This is ammonia, and his reason for this is, doubtless, that he assumes with Liebig, that plants are capable of obtaining a sufficiency from the atmosphere. There cannot be a more erroneous opinion than this, or one more injurious to agriculture. Until very lately, the value of the different substances in use as manures has been judged entirely by the effect produced on the crops, without the slightest knowledge, on the part of the agriculturist, of the component parts of such manures. After innumerable experiments, a certain class of substances are selected as being most suitable for various plants, and, if I mistake not, all the best manures for the hop are organic substances rich in nitrogen or ammonia; and with little mineral matter, such as rags, rape-cake, oil-cake, dung; Peruvian guano, too, would probably succeed very well; for as long as abundance of ammonia is employed, there is little fear of the produce falling off for want of minerals. As all these manures contain some minerals, the annual decomposition of the soil will furnish more, and if the *bine and leaf is returned to the soil* (which should always be done), the loss annually will be confined to what is taken away with the hop, which the usual manure would supply.

"Having cultivated wheat for some years successively on the same soil, as an experiment, I am able to speak very decidedly upon the necessity of using abundance of ammonia to obtain large crops of corn; without it the produce quickly falls off, and no amount of, or combination of minerals is able to restore fertility. Although I have had no experience in the cultivation of the hop, the fact of its requiring abundance of manure satisfies me that it derives its nitrogen from the manure, and not from the atmosphere; and I am sure you can follow no safer rule in selecting manures for that plant, than to buy those which contain the largest amount of ammonia at the least price.

"Yours very truly,
" J. B. LAWES.

" *Roehamsted, April* 16th, 1846."

IMPROVEMENT OF FARM-YARD MANURE.

BY MR. MAIN.

From the year 1803 to that of 1808 I had the charge of a farm on which a very superior style of business was carried on. It comprised above 400 acres of arable pasture and meadow; the soil varying from gravel to a light loam. The surface was considerably undulated with easy swelling knolls, and gentle hollows between, the eastern slopes being invariably the best and deepest loams, while the western brows were sharp gravel. A small lively trout stream traversed the farm from west to east, and the level meads on each side bore heavy crops of hay, but of rather a coarse character. Both the meadows and pastures were better calculated for light than for heavy live stock: Southdown sheep and the smallest sized short-horn oxen were found best adapted for the natural powers of the land. It was resolved to improve the character of the estate by every practicable expedient. Draining was extensively executed; cumbrous old fences were grubbed up, and new hedges planted. But the natural poverty of the land could not be improved otherwise than by bestowing on it liberal dressings of the richest manure; and this could not be had either cheaply or conveniently, except by entering on a comprehensive system of cattle feeding in all its branches. Hence a quadrangle of feeding houses, sufficient to tie up at the same time nearly forty head of cattle, were erected on the most approved plan, far superior to anything of the kind that had ever been erected in England before. Each stall was fitted up with a cistern, manger, and hay-rack. At the ends of each range of stalls were pumps, store-rooms for fodder, cake-machine, and drawers for holding mixed manger meat, which were easily transferred to the feeder's barrow, and wheeled along a passage at the heads of the cattle when fed. The greater number were haltered, but six of the forwardest were loose in boxes, and consecutively sent to market as they became fit for the butcher.

At one side of the quadrangle the piggery was placed, and a very complicated building it was. In the centre there was the pig's kitchen, fitted up with a large copper, various binns, and surrounded on three sides by separate styes, into which shoots were led from the kitchen, so that the feeder could serve the whole stock without quitting the kitchen.

Over the kitchen and centre of the quadrangle was erected a granary supported on posts; and around which a sloping roof was extended ten feet outwards, its eaves supported by posts also, the whole forming a large covered space, into which all the dung from the stables and feeding houses was brought, and daily and regularly piled in horizontal layers, all over the floor under the roof, so that neither sun to dry nor rain to wash the manure were admitted to deteriorate it, or extract its fluid qualities. Nor was this all; a capacious water-tight cistern was sunk at one side of the bed of dung, which received all the rich drainage from the stables, feeding houses, and styes, as well as the oozings from the dung itself. In the cistern a lofty pump was erected, which served to empty the cistern, and, by means of spouts of various lengths, conveyed the contents of the cistern over the whole body of dung every morning, so as to keep it always completely saturated with its own liquor. This was a part of the feeder's duty, and therefore never neglected. The arrangement of the buildings for the abridgement of labour, for the convenience of preparing the food, and feeding the cattle, and for the comfort and well-being of the animals themselves, were all admirable. But no part of the plan was more economically excellent than that of preparing the dress for the field crops. Prepared as it was, it could not be otherwise than rich, because much linseed cake was used, as well for sheep as for cattle, there being a crushing mill of three presses on the estate, built entirely for supplying the feeding houses. The value of this concentrated manure was clearly evident by the magnificent crops of turnips, barley, clover, and wheat, which invariably followed its application; and I had the most convincing proofs, in after years, that a coat of that feeding-house manure continued visibly serviceable to the crops for *nine years* afterwards, without any repetition of this or any other description of dress whatever.

The same accomplished agricultural economist and architect, Mr. Thomas Howse (a native of the Vale of Aylesbury, and a contemporary of the eminent graziers and feeders, Messrs. Westcar, Grace, &c., names so conspicuous in the annals of the "Smithfield Club," of that part of the country fifty years ago), was equally attentive to the comfort of the fattening sheep in the open air as he was to the cattle in the houses. He invented portable hovels of extremely thin and light materials, formed in pannels, and united by hooks and staples, which could be put up or taken down in a few minutes by the shepherd and his boy. Each division of the hovel had its own little rack for hay, and trough for sliced turnips, chaff, or cake. In bad weather, and especially if wet, or when snow was on the ground, it was quite delightful to see how the sheep enjoyed themselves under this temporary erection, and which greatly assisted their arriving at a marketable condition.

While the whole of this system was carried on, during the war, it was profitable; but the steward dying in 1802, the system was relaxed under the new steward, and in 1808, the farm and oil-mill were let, and the feeding establishment broken up. But the advantages and effects of the feeding system were ultimately enjoyed by the landlord, whose rental was advanced from 12s. 6d. and 20s. to 25s. and 35s. per acre, at which rental it still remains in the parish books. This was the result of the attempt to improve one of the poorest gravelly spots in England; and though the object was so far gained as to prompt the barren gravels to yield remunerating crops, it was perfectly obvious that without frequent applications of feeding-house dung, these hungry gravels could not be kept sufficiently fertile to pay accompanying expenses.

Another thing which rendered stall-feeding on such a locality unprofitable, was the absence of rich pasturage, on which the beasts might have been made half fat before being tied up; for stall-feeding entirely on artificial food rarely pays the feeder. And it is only when rich pastures are united with judicious stall-feeding that any handsome return can be realized in fattening beef for the shambles. Even the celebrated prize cattle seldom bring anything but *honour* to the exhibitor; but at all the principal feeding stations for the London Christmas market, we invariably find the richest pastures around the feeding-house.

In the foregoing observations there is not anything of practical value, except it be that relative to the management of farm-yard dung. The idea of keeping manure in the shade is good, because it is quite evident that the humid riches of the dung are quickly dissipated by the sun's heat and light. And placing it so as to drain itself is also proper; because if too much drenched with water, whether from lying in a hollow, or too much exposed to rain, it is always inferior, from not undergoing the necessary fermentation. The rich juices of the dung, however, should always be preserved by some means or other, and not allowed to run to waste, which is too often the case. Although there are but few farmers who can prepare their dress as described above, yet, as the principle is sound, it is worthy of imitation whenever or wherever practicable.

It may be added, in conclusion, that, when too much refinement is recommended to be introduced into the homely business of farming, and though such advice may be philosophically and even practically right, yet it can scarcely be expected that such rules can be readily adopted by the generality of farmers, who will, as usual, compound their dung heaps upon a base of absorbent earth, and content themselves with a covering of the same, both as preventive of the escape, and retentive of the fugitive fluids.—Journal of Agriculture.

DISEASES OF SHEEP.

The periodical meeting of the Stratford-on-Avon Farmers' Club, took place on the 12th inst., at the Town Hall, the President Darwin Galton, Esq. Edstone Hall, in the chair. A paper was read by H. L. Smith, Esq., of Southam, on "The Diseases of Sheep, particularly that of Hydrocephalus or the Gid." He observed—

It is now nearly forty years ago since Mr. Cline, a celebrated surgeon of London, and lecturer to the united hospitals of St Thomas and Guy's, having long turned his mind to agrarian pursuits, observed to me, that he thought much valuable information would be obtained by medical men paying some attention to diseases of animals; that they had frequently much time unoccupied, especially in early life; and that by observing disorder in its most simple forms, as the principles of life are ever the same, it was by no means unlikely (even if they made no original or important discoveries) that they would, at least, mature their experience by verifying that they had already learnt, much sooner than they could do without. The same gentleman had written a paper on the forms of animals, of which the celebrated Mr. Bakewell, of Dishley, said it was delightful to find that Mr. Cline by theory, and himself by practice, had come to the same conclusion, namely, that the attention of breeders should be directed to the thorax, or chest. which was the seat of the heart and lungs. Those essential organs to healthful life could scarcely have too much attention paid to them. As I intended to devote myself to a peculiar branch of the profession that required great manual dexterity—a dexterity that would be slowly acquired by the slow return of operations on the human body—I determined to get my hand in practice by operations on the eyes of animals. I have no doubt that you are aware of an occasional epidemic that affects the eyes of ewes, by which whole flocks become nearly blinded. But it was not from this malady I derived so much information as from that which I am now about to describe to you.

On enquiring for blind sheep I found that they were generally two-year-old animals, and that the blindness was produced from an internal cause. About this time I met with a gentleman, Mr. T. Gardner, who invited me to see him open the head of one, and I think we procured three from one farm, which were operated on by him with various degrees of success. This was a subject of great surprise to him, because, as the disease appeared the same, the operation the same, and little that he could distinguish different in other circumstances, it appeared to him quite unaccountable: but I discovered the cause of his failure where he expected success, and I believe the same cause has prevented the operation from becoming general. The cause of the blindness usually affecting one eye in sheep is the growth within the brain of a group of animalculæ called *cœnurus cerebralis;* they are found within a vesicle from the size of a pea to that of a large walnut, frequently containing eight and ten drachms of water. This vesicle gives the name of the complaint, and shepherds and butchers call it the "bladder." Sometimes it is called the "staggers," from the animal's mode of moving when under its influence: another name by which it is known in the southern counties is the "dunt." There are a variety of these vesicles affecting man and other animals besides sheep, and they are found in other parts of the body of sheep, as on the liver, on the part of the membrane holding the intestines together; but they have nearly the same general character—that of a simple vesicle filled with fluid, the nidus of a number of individuals which adhere closely to it; their bodies are soft, opaque, and cylindrical, and are commonly, from their minuteness, taken for the ova, or egg, of other vesicles. Pennent calls them *tenia cerebralis,* and T. Laennec *polycephalus cerebralis.* The origin of these and other entozoa is involved in great obscurity and I am unwilling to waste the time of practical men by speculations, which may be so much better occupied by detailing the best means of relieving sheep of them when they affect their heads.

In the commencement of the complaint the affected sheep appears melancholy, and is a little separated from the flock, but, on being roused, immediately joins them; this state frequently lasts for a month or six weeks, at the end of which time they become more and more stupid, and it may then be seen that they are not quick at discovering their companions, and also that they always graze in one direction, with the head slightly turned on one side or the other,—this arises from their seeing only with that eye towards which they turn, and accordingly, as the disease advances, you may come close upon them and catch them, if you are careful to keep on the outer side and not come within the range of the eye that is on the inner side. Where these symptoms are well marked, you may be sure that the animal is curable by an operation, because the bladder is situated upon the brain, or within the right or left ventricle. If, on the contrary you find that the animal frequently falls on his hind quarters, and holds his nose up, as if the back of the head was pressed down, you have not the same chance of success by an operation, inasmuch as the bladder is probably situated on or within the cerebellum, and not to be got at without wounding more vital parts; and here it is as well to observe that there is no comparison in the degree of danger between wounding the brain in the fore and back parts of the head; persons and animals frequently recover from extensive cuts and lacerations of the anterior part of the brain, that die from injuries not one sixth of the extent, if they affect the back of the head; and, in operating on sheep, I have known a piece of the anterior part of the brain come away between and involved with two or three vesicles, and, from fly-blows (from neglect in not keeping the part carefully covered) the anterior surface of the brain become covered with maggots, and yet the animal get perfectly well. There are also instances in the human subject of pieces of the anterior part of the brain being lost by accidents, without permanent injury to the mind of the individual.

The Operation.—When the complaint has fully established itself, I recommend that the operator watch the animal a few minutes before it is disturbed, and after a few times he will be able to make up his mind to the precise spot where he may find the bladder. The sheep should then be placed on a frame of canvas or a hurdle, so that the head may be about three feet from the ground, which prevents the necessity of the operator stooping, and enables him better to graduate the force he intends to apply to his trephine, and upon the ease and dexterity with which he can change its movements or lessen and increase its power, all the beauty and dexterity, and much of the success of the operation depend. The sheep being so placed that the legs may pass between the bars of the hurdle or openings in the canvass, that they rest on nothing, which prevents struggling, with a sharp knife, make a triangular incision over the head, cutting down at once, firmly and cleanly, to the bone; if there is much wool on the head it should be carefully parted, but on no account cut off, as it becomes very useful in afterwards bringing and holding the flap in place again. It is of great importance that this flap should be made quite large, that you may not be confined in future movements of the trephine. It should then be kept firmly back, and the trephine, with a half-circular motion, used till the bone beneath the flap can be taken away quite clean and free from rough points. It will be necessary, during the time of operation, as the under surface of the bone is very irregular in thickness, to occasionally introduce the point of a quill cut like a tooth-pick, that you may ascertain the portion of bone through which the trephine has passed, and not continue using the instrument heavily when the connections of the inner part of the cranium are nearly sawn through, or you may find your instrument suddenly buried in the brain. Having removed the circular piece of skull as carefully as possible, wipe off the bone-dust from the dura mater, and you will probably find that it is very elastic under the pressure of your finger, from the bladder rising up against it; if so, you had better, with the point of a lancet, make an opening into it, and you will find the bladder slowly protrude itself through the opening; if so, do not be in haste to extract the bladder, which will probably burst; but when a considerable portion has risen through the opening in the dura mater, you may empty its contents into a wine glass and take care as it gradually collapses to firmly grasp it with your finger and thumb, and slowly and steadily extract the entire vesicle, which will then probably contain two or three tea spoonfuls of limpid fluid at the bottom.* This finishes the operation, and although the cavity of the skull is more than half emptied of its contents, yet it will soon go into place again; the brain which had been compressed on the spinal column will rise up and resume its position, therefore no unnecessary time should be lost in laying the flap of integument in its place again, and securing it then by passing a thread through the flap at the angle and tying to the opposite corner; the whole may be covered with a little flour and blood in cool weather, but in hot weather, to keep flies away, it may be as well to put a little pitch and wool, which will probably protect it from the flies, and the whole may be covered with a cap of the lightest description. This is the history of the operation under general circumstances, and, after which, you may safely pronounce that your patient will do well; but it will sometimes happen that in extracting the bone, you have abraded and torn the dura mater, that is the membrane that lies under it; if so, it will be well to cut it off with a sharp pair of scissors, as a smooth edge is much more likely to heal readily, than a rough surface left by the trephine; or you may not have the bladder rise up so soon or so fully as you expect; if so, I have frequently passed the point of a lancet deeply, but gradually, into the substance of the brain and have cut it out when I found the water; or secondly, you may have made a mistake in not discovering the side in which the bladder is placed, for you must remember that it is almost universally on the opposite side of the head to that affected with blindness, for the nerves of the eye cross each other at the base of the brain, and the consequence is that the sight is affected on the contrary side; whether from forgetting this, or any other cause, you have opened the wrong side, it will be in vain to endeavour to reach the bladder through that opening, and the better way will be at once to repeat the operation on the other side, and if you are then disappointed you may make the two circular pieces into one elliptical opening by means of a saw which is known in the profession by the name of Hey's saw, and which is a very useful instrument, and if you are able to succeed in this manner to extract the inside, the sheep will perfectly recover, for extensive injuries of this kind are borne, without destroying the animal, in a manner that is almost incredible; and I hope that if the operation should become known and practised, it should be kept as much as possible in the hands of masters, for if common and hard-hearted persons once witness recovery after a great injury has been committed, they are apt to consider an accidental as a necessary circumstance, and convert every case that comes under their notice into one of cruelty and outrage. On the contrary, a person of feeling, whilst he may be delighted that there is so much inherent vitality in animals as to recover after extensive wounds, will be still careful not to put the animal to unnecessary pain, and hold himself the more responsible to do that with the same care as he would desire a surgeon to excercise on his own head. It is perfectly surprising how soon, when taken from the cradle that supported them, and placed on the turf, they begin to graze, and which should always be in a small place by themselves, for though they are willing to join the flock immediately, they had better be kept away till the sight is recovered and they may escape the playful butting which those in health are continually giving to their companions. They very seldom require any dressing afterwards; but it would be as well to examine the head occasionally and keep the part freely defended from fly-blows, which in hot weather are likely to be very troublesome.

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* When the operation is completed I certainly should endeavour to cover up the opening of the skull as quickly as convenient but this is the only part of the operation that should be done quickly. It is infinitely better to operate slowly and carefully at all times than sacrifice any chance of ultimate success to the mere appearance of manual dexterity—the great fault of young operators. The consequence of operating by a stop-watch is most pernicious to the general success of operations.

If the complaint is on the surface of the brain, it is by no means unusual to find the under side of the bone so much reduced by absorption as to be perfectly thin and elastic, and a small portion may be elevated with a strong pointed knife, and under these circumstances the animal is sure to do well; and I believe there are such cases as you occasionally hear of being cured by persons who cut and wound the heads in a manner merely brutal. I think the advantage of knowing under what circumstances the operation is effected, and under those in which it cannot succeed (which it cannot if you are obliged to wound the cerebellum or that part of the brain immediately over the spinal column) is considerable, because in the latter case you had better at once kill the animal, and, as the flavour of the mutton is not spoiled, distribute it in such manner as you like; whilst if the operation is successful, the animal will soon be trebled in value, and will answer every purpose of feeding or breeding as if nothing whatever had been the matter with it. The instruments necessary may be procured at any surgeon's instrument makers, and two successful cases will repay you for the first outlay.

I rejoice in having had an opportunity of explaining to so respectable a company these operations, because thirty years ago I was obliged to desist from them, owing to the prejudice many persons really entertained against a medical man who could venture to experimentalize on animals. This prejudice, with which you cannot agree—for it is prejudice, and has neither eyes nor ears for truth—is daily becoming less: a thirst for knowledge is extending through all ranks; opinions, principles, and practices, whether they affect public or private interests, our physical, moral, social, or religious state, are now subjects of keen inquiry, contest, and investigation (and in too many instances of bitter strife and heartburning). If there is any field of knowledge in which one would expect mutual improvement and candid explanation, and manly benevolence could find encouragement, it is exactly amongst those who, engaged in husbandry, are following a calling more useful than any other to mankind, and who own no master but the Creator and Author of all things. It is true that, under the most favourable circumstances, their profitable reward may be uncertain; industry, forecast and prudence may not always be successful; too much sun, or too much frost may occasionally disappoint their best exertions; but with rightly constituted minds, farmers and husbandmen do not murmur and repine under visitations of Providence, they know that it is a part of their term of holding, and acquiesce in habits of obedience to Divine dispensations, which are rarely found in other classes.

Mr. Smith, on terminating the above paper, remarked that in the course of his researches on Hydrocephalus, he took an opportunity of studying the "rot;" and if he should not be trespassing on their time, it would give him great pleasure to lay before them the result of his labours, which he observed, he would give as suggestions, not as conclusive opinions. In the course of my inquiries on the blindness of sheep, I was induced to investigate the history, causes, and cure of the rot, a disease more extensive, more destructive, and equally obscure with the former; and I will proceed at once to point out the means that I tried in many instances with the greatest success. It was a combination of salt and iron. This was the theory on which I founded the practice: the animals in the advanced stage generally died dropsical, and I found that their blood did not contain either that portion of saline material or iron that healthful blood should do; and that, wherever I could obtain a good historical account of the disorder, the animals had almost universally been exposed to wet feeding or the rank rapid growing grass of meadows, where it was probable that the alimentary part of the grass was not so fully ripened and prepared for distribution as it ought to have been; and, therefore, we might expect, *a priori*, that whatever lived upon it must have their chyle, and consequently their blood, deficient in these not only important but essential constituents, for salt and iron are important elements of animal life.

Two ounces of the rust of iron, called the carbonate of iron at the druggists, mixed with one pound of common salt, in six quarts of water, would make a red gruel, two horns of which may be administered to each ewe every day that it is affected, and it will commonly be followed by a great discharge of flukes; it should be repeated for three days in succession, and may be repeated again in three more days.

There is sometimes an immediate change for the better, but I do not at this time feel disposed to enter into all the contingencies that may occur, and should be attended to by the shepherd having flocks under his care, hoping I have said enough to induce others to inquire and investigate into the nature and origin of this terrible complaint.

Darwin Galton, Esq., rose, with much satisfaction, to propose a vote of thanks to Mr. Smith for the very excellent paper read that day.

Mr. Sergeant most cordially seconded the proposition, and he was sure in expressing his own feelings he was only echoing those of the members present, for all must be gratified at listening to such an able, lucid, and instructive paper, and when it was fully reported, they who had absented themsrlves would readily (but too late) perceive the loss they had sustained.

CRANBROOK FARMERS' CLUB.

Mr. **Barnes**, of Staplehurst, proceeded to say that with respect to manure, he had not used guano, bones, urate, rotten dung, rape dust, and other manures, but as far as his own experience went, he had found guano to answer best. He knew many supposed that guano and other artificial manures would do no good after the first year; such was not the case. The reason many could not perceive any good from guano the second year, was because they did not put enough on the first year. Supposing they put but about 30s. of dung on an acre of turnips, what good would they perceive from it the second year? Now, he sowed his guano broadcast, and he used ten cwt. to the acre. The result was, that he could see its effects for two or three years afterwards. On a field which he thus manured with guano—a very poor field—not worth more than 10s. per acre, and a better piece of turnips they would not often meet with. He pulled a part, and a part he left for seed. The part that he pulled yielded 800 bushels per acre. From the experiments he had made, he did not think that seed turnips exhausted the land so much as was generally supposed. He had used guano for growing cabbages, mangel wurzel, and carrots, with good results. His impression was, that on their stiff soil wheat should not be sown after turnips, because the turnips could not be removed from the land early enough; but they might sow oats after turnips and get a good crop. He thought they ought to let the turnips remain in the ground, where they were not previously wanted for use, till they showed symptoms of sprouting, and then, not place them in buildings where they could not have sufficient air. A very good mode of keeping them was to make a pen with wattles, but the lump should not be more than one wattle wide; and then by placing a sufficiency of straw over them to keep them dry, they would keep well. The air would pass through them, and it would prevent them from sweating; this was a very effectual and cheap mode of keeping turnips. He had grown a small portion of cabbage. Some of the land he manured with the dung, and the other with Peruvian guano. He laid twelve cwt. of guano on the acre, and the worth of the dung that he used was the same per acre as the guano cost. The result was that where he used dung the cabbages were not larger than his hat, but where he used guano, the cabbages were exceedingly fine. He thought that if a small portion of land was set apart for this crop, the farmer would find it highly advantageous. On one acre of land which he manured with twelve cwt. of guano, he grew about 600 bushels of carrots, and on an adjoining acre, manured like it, he sowed mangel wurzel; but the greater part of them went to seed as well as where he manured with dung. but whether that was owing to the seed or not he was unable to state. With respect to the potato, he was extremely partial to that root, but there were some very great doubts as to the result of the next year's crop. For potatoes he treated his land in precisely the same manner as he did for turnips. Last year he planted a field with potatoes; on one part he manured with rape nust, another part with guano, and the other with dung. The value of each kind of manure per acre was the same, about £5. The blight took the whole of the field, but before the blight came there was very great difference in the appearance of the haulm; that portion manured with guano looked the best, that with rape dust the next, and that with dung the worst. The part manured with the rape dust was affected with the blight first, that manured with dung next, and that manured with guano the last. He grew more potatoes where the land was manured with rape than dung, but less than where it was manured with guano. Of all the root crops, his impression was that the Swede turnip was the most useful. They might get them in at a time when they could not get in the potato and mangel wurzel; and, taking it in all its bearings, he thought it was the most valuable of the different kinds of roots; and carrots, he thought, were better than turnips. With respect to potatoes, if they were certain of escaping the blight, no doubt but they would be found very valuable. As far as milch cows were concerned, he thought there was nothing like cabbages. He certainly intended to try some further experiments this year, and the result he would give them on a future occasion, if spared so long. The next question to be considered was the expenditure and the value of the crop, for no system was good unless it turned to profit. It was useless for him to say he did so and so unless he was able to show that some benefit arose from it. Their object in relating to each other their various modes of cultivation was to learn how the largest crop could be grown with the least outlay. Now, his expenses for workmanship, tithes, rates and taxes, rent (16s. per acre), manure, and other et ceteras which he enumerated, amounted to £7 14s. 2d. per acre; and, as he grew 800 bushels of Swedes per acre, these, at 3d. per bushel, amounted to £10. He considered a bushel of Swedes was worth more than an oil cake, and consequently were worth 3d. per bushel. Last year he sold two-and-a-half acres of Swedes at 7d. per bushel, which amounted to £23 6s. 8d., but they could not always sell their Swedes for such a price. The expense for cabbages was about the same as for Swedes—there was but a trifling difference between the two. In his calculations he had set his manure at half the price that it originally cost him. Wherever he had tried it he had found the effect of the guano in his oat crop in the second year. In the field he had already spoken of, one of the poorest on his farm, they thought it very good indeed if they grew five quarters of oats to the acre. It was a small piece of land, and he did not thrash the oats separately, but so far as they were able to judge, this land, after the turnip crop and without any extra manure, produced at the rate of ten quarters of oats per acre. It was a very fine piece of oats indeed. Now, if the turnips took out the whole of the manure, it would have been impossible to have grown so large a quantity of oats. And, if they considered that the quantity over and above the usual five quarters to the acre was attributable to the manure left in the ground after the turnips, that gave an additional advantage in favour of the turnip crop. There was no fear of exhausting the land if they put on a sufficient quantity of manure. It was said by some that they would grow more oats if, instead of putting on ten cwt. of guano to the acre for turnips, they were to put five cwt. for turnips, and the remaining five cwt. for the oats. He thought not, for the turnips would take out that which the oats did not want, and leave a greater amount of that which the oats required. He thought that without that particular treatment for the turnip crop as he had detailed, he should not have been able to grow turnips on the land he did larger than hens' eggs. It was usual to give a large dressing of manure at the commencement of a rotation of crops. He considered the turnip crop the first in the series. This was the fourth year he had adopted this plan. If he did not sow turnips he should fallow the land, and therefore the crop was not altogether a loss. He never ploughed his land after turnips for the oat crop. He loosened the ground up with the nidget or scarifier, and either drilled the oats in in rows, or worked them in with the harrow. With the oats he sowed clover and trefoil; the guano was not all exhausted with the oat crop, and he got an excellent piece of seeds. After this he sowed the field with wheat, and upon that rye grass, and then it went on for turnips again. Mr. Barnes then related an experiment which he tried four years ago on five acres of Swedes, which the following year he sowed with oats. He manured one acre with dung, one with rape dust, one acre with urate, and one acre with ground bones. On each acre he laid £5 worth of one of these several manures on the acre, so that each acre cost just alike. On the dunged acre he grew 300 bushels; on the guano acre, 640; on the rape acre, 460; on the urate acre, 380; and on the bone acre, 480. Well, the next year he thought as he did not grow so large a crop on the dung acre on the previous year, he should see its effects over the others in the oats, but his oats were the worst where he had manured with dung and with urate, and best where he manured with rape and with guano. Having thus detailed to them his experience on this subject, he begged to say that he was extremely obliged to them for the attention with which they had listened to his remarks, and to add, that he should be very happy to hear the observations of any one who differed from him in opinion.

The Chairman, after having asked the company if they had any remarks to offer, and no one immediately rising, said it might seem presumptuous in him to offer a few remarks, when he saw around him so many that were far more experienced in agricultural matters than himself. Mr. Barnes had said, and truly, that self-conceit was one of the faults of the farmers; and he was not, he must confess, entirely free from it; for he must confess that he firmly believed he was brought up by a first-rate farmer himself. He was brought up under the guidance of one who farmed from 1,500 to 2,000 acres of land, and he had often heard him laugh at the numerous new plans that had been adopted—of the subsoil plough and of the mole plough, and various other things. They had put a numerous quantity of tiles into their land, and the whole of it was now thoroughly drained. He thought the first step the farmer had to take was to drain his land well, and there his own motto was, "science and practice;" for, unless these were united, it would be impossible to keep pace with the growing wants of the people. He thought that farmers in this part of the country were very far behind their northern neighbours; but farming here had improved wonderfully during the past few years; and he agreed with Mr. Barnes's remarks on the advantages they might derive by meetings on these occasions, and listening to each other's observations on their various treatments of their crops. He thought that of all the root crops, the Swede turnip was the most important. The cultivation of the Swede turnip he was better acquainted with than that of the other sorts, which amounted, he believed, to about forty in number. For his own part, he had always to do with land that had been well drained. This was a subject of great importance; for, unless their land was well drained, the manure would be washed away by the rain, and would do comparatively little good. Their system of cultivation for the Swede turnip was this:—They ploughed the land early in the winter, and about May they commenced working the land with harrows, with the nidget, and afterwards by a very heavy harrow, vulgarly called a "Kill Devil." They always liked, if they could, that this should go in up the beam. It was killing work for horses, but it was a most excellent thing. Having thoroughly pulverized the land, they sowed their seed, but they did not sow more than half a gallon to the acre, and they seldom failed in getting a good crop. In dry seasons they might be thinner than when they had wet weather, but the turnips then grew out to a large size. He spoke in the capacity of a landlord, and also of a tenant farmer. He had tried all sorts of manure, and he gave the preference to rape dust. His father always gave the preference to rape dust. The chairman then related some experiments that had been tried as to the nutritive qualities of the various roots. The potato, it appeared from these experiments, possessed the greatest quantity of nutrition in 1,000 parts; the mangel wurzel next, the parsnip next, then followed the carrot, and after that the Swede with turnip.

Mr. Geo. Buckland, secretary to the association, said that he greatly regretted the absence of a gentleman who intended to be present, but was prevented by another engagement. He meant Mr. Neve, of Benenden. That gentleman had had great experience in root crops, and he was sure they would like to hear what he had to say on the subject. Mr. Neve's mode was something very similar to that described by Mr. Barnes. He (the speaker), however, thought it was a question whether the growth of root crops in the Weald of Kent might not be carried to an injurious extreme. As they all knew, Mr. Neve was an extremely clean farmer, and he would engage to carry on his back all the weeds that could be found on his farm. Had he been present, he would have been able to tell them much better than he (Mr. B.) was able to do. He gave his land an early ploughing, and as his land was well drained and subsoiled, he generally got a pretty good season. Like Mr. Barnes, Mr. Neve also objected to spring ploughing for root crops, as there was a great difficulty in reducing the soil at that period. The clays in the Weald were exceedingly tenacious, the particles of which are almost impalpable, and adhered together so closely as almost wholly to exclude the moisture which was necessary for their disintegration. He thought they ought to render the root crop perfect in that district rather than extend it. They ought to endeavour to grow on one acre as much as many farmers now did on two, and this he thought might be done by clean and good culture. The ground should be thoroughly pulverized and reduced to a fine tilth, and horse hoeing and manual labour should be incessant throughout the season. Their worthy chairman had read to them the comparative quantity of nutritive matter in different roots, but he believed it was generally considered by chemists that the nutritious properties of roots varied according to the soils in which they were grown. He recollected that a few years ago the late Earl Spencer made a trial in fattening some bullocks, of the comparative nutritious properties of mangel wurzel and Swede turnips upon stiff clay, which was not easily reduced.

Mr. JOHN HAGUE said he had grown turnips for the last few years, and had been rather successful. His course of management was this:—After wheat he ploughed, as early as possible, a pretty deep furrow, on land that had been well drained. His land was then subsoiled, if it had not recently been done, and then the ground was allowed to lie till the spring of the year. By this means he generally got a good season. In the spring he first used the common harrow, and then he put in the Riley cultivator, which he believed was the very best instrument that had ever been introduced into that part of the country. This was the only means by which he had ever succeeded in getting the land in a thoroughly pulverized state. He then gave the land a rolling, after which he made furrows, twenty-seven inches apart. After this he gave the land a dressing of good rotten yard dung, laying on at the rate of about thirty loads to the acre. He did not use rough dung, but such as had been well rotted and prepared. The ridges were then split, and the dung was "healed" lightly over. He used formerly to heal it over thicker with earth than he now did, but he found that plan did not answer so well, as it was a long time before the plants reached the manure. He formerly had his rows eighteen inches asunder, but he now invariably had them twenty-seven inches. He had tried experiments as to the respective differences in the distance; and while he grew 800 bushels of Swedes to the acre, where the rows were eighteen inches apart, he grew 960 bushels to the acre, where the rows were twenty-seven inches apart. But, besides growing a larger crop, the wider distance was better for cultivation. When he first begun to grow turnips he fallowed for the crops, but he found that when they had a dry summer, he could not get the land to pieces; he therefore now never fallowed for turnips. As for manure, he had tried guano, rape dust, soot, wood ashes, and bones, but he found he got the best crops from farm-yard dung; bones was the next best, and guano next; he therefore gave the preference to dung for turnips. He drilled in his seed at the rate of half a gallon to the acre, and he had always found that quantity sufficient. He had never failed in getting a crop. He was never troubled much with the fly. When he found his plants attacked with that insect, he used the same means as Mr. Springett had spoken of. He threw over the plants a little lime, and in a few days afterwards the fly was gone.

Mr. BARNES said Mr. Hayne's soil was not stiff clay, and was very different from his own. With respect to guano and other artificial manures, he believed it was now universally admitted that it was better to sow them broad-cast, as they did not come so immediately in contact with the seed. But, although these manures were mixed with all the land, the turnips obtained the full benefit of it, as they threw out fibres, and gathered it in.

The CHAIRMAN said they always sowed their artificial manures broad-cast, and they sowed it also the day before they sowed the seed. They once put some rape-dust to some potatoes, and where they were not covered the same day they rotted.

Mr. CORKE said the same thing happened to himself two years ago.

Mr. BARNES said he was going to try an experiment with bones, guano, the Cornwall white manure, bones and vitriol, and prepared night soil, and he would report the results to the club.

Mr. J. COLLIER said that a few years ago the men in his parish came to him day after day for work, and at last he set them to work planting potatoes, a hill in each square between some young hops, and manuring them with dung water from his yard. The potato haulm grew as high as himself, and some of the hills yielded half a bushel of potatoes each. Throughout the garden three hills filled the bushel. Thus, by employing people who had nothing to do, and using manure which would otherwise have been wasted, he got a crop that more than repaid him the expense it cost.

Mr. CORKE said that in 1840 he had a piece of turnip. On one part he sowed five cwt. of rape dust to the acre, and on the other part eighty loads of good dung to the acre. He had twice the quantity of turnips on the rape as on the dung, and the wheat afterwards was quite as good where the rape had been down as where the dung had been laid. He was of opinion that rape and guano were the best manures for turnips.

Mr. J. BARTON, of Flimwell, thought that it was best to sow the manures broadcast. After he had got a season, he used the snap plough, and threw the field into ridges, and drilled the turnip seed on the ridges. He thought turnips grew much larger in ridges than on an even surface. He had made a trial of thirty loads of good rotten dung to the acre against four cwt. of Peruvian guano and six cwt. of Ichaboe guano, and he found the Peruvian guano the best. His soil was sandy. In another trial made last year between guano, wood ashes, Boast's inorganic, and rape dust, the cost of each of which was £2 5s. per acre. Guano was the best, rape the next, and the inorganic did very little good. After some further discussion on the point, but which was only a reiteration of the same principles as had been already stated, the following resolution was unanimously carried:—"That in order to ensure a large crop of turnips in the Weald of Kent and Sussex, the land should first be well drained, and ploughed early in the winter, and subsequently brought into a complete state of pulverization; and that, by a thorough system of cultivation, the growth of the turnips and other root crops may be beneficially extended."

MEAL AND FLOUR FROM POTATOES.

The following article taken from our cotemporary *The Irish Farmers' Journal*, upon this most important subject, seems at length to have been brought forward in a manner likely to command attention, and elicit the actual facts. It is almost needless to say that the nutritive value and productiveness of the potato has been long a vexed question; one, we fear, little understood by those whom it concerned most, and much descanted upon by those who, it would appear, understood it least: at all events, so it seems to be, from the statements now brought forward.

The matter has been taken up with much ability by Mr. Jasper W. Rogers, of Dublin, a civil engineer, who appears to have given the merits of the question considerable attention for several years. The facts he brings forward are indeed startling, for it would appear that the nutritive properties of the potato when *wholly* converted into *meal or flour* vary very little from those of wheat; while the aggregate produce in "nutritive material" proper for the support of animal life, which can be obtained from any given quantity of land, is FOUR TIMES *that which can be had from wheat.*

Can this be possible? Yet it would appear that the fact is backed by the undisputed results of agricultural and chemical experiments of the highest authorities, not sought for as regarded the potato only, but upon the general produce from vegetables, and their general nutrition.

We conceive it but right to draw attention to this subject, and urge its anxious consideration and investigation. If the statements brought forward by Mr. Rogers are facts, they are of the utmost consequence to the agricultural community. If they are not, full opportunity shall be given, so far as we are concerned, for ascertaining the exact reality. That the food produced in such variety appears to be excellent is evident: thus far it may be said "*the proof of the pudding was in the eating;*" but that we should be so long in the dark as to the actual produce of the potato, in comparison with wheat, is indeed strange, and we shall only add that if the proof of this fact has been reserved for Mr. Rogers, he deserves well of his country, which so mainly depends upon the potato; and we wish him all due recompense for his talent and labours.

ARTIFICIAL PREPARATIONS FROM THE POTATO.

There is no other of our agricultural plants which have come in alternately for so great a share of eulogy and abuse as the potato. On one hand we hear of its being one of the best of nature's gifts; and on the other, that to its general cultivation in this country we may ascribe most of the misery of its inhabitants. Notwithstanding all the discussion which has taken place on the subject, it is surprising that the real value of the potato should be so little understood. In its ordinary form it is one of the most perishable articles of food which we possess; but it is capable of being rendered, by artificial means of an extremely simple character, not only portable, but capable of being preserved for an almost indefinite period. There is, in fact, scarcely any other vegetable production capable of being made to assume so many forms, or of being turned to account in so many different ways; but although this property has been long known to scientific men, it is surprising how little way has hitherto been made in putting the lower classes, who are forced to exist almost exclusively on a potato diet, in possession of this information.

The disease which made such ravages among the potato crop of last season has caused attention to be forcibly directed to these facts; and the conversion of the decaying portion of the crop into farina was a favourite project. It being known that the attention of Government was directed to the matter, numerous statements on the subject were placed before his Excellency; and among others one from Mr. Jasper W. Rogers, C.E., who had more than ordinary experience. That gentleman's plan was considered so very satisfactory that his Excellency the Lord Lieutenant at once gave directions that facilities should be granted for having it fairly tested. Some of the results of Mr. Rogers's method of making the potato available as food, in many different forms, were exhibited on Saturday last, in the Board-room of the South Dublin Union Workhouse, before the guardians, and a number of other influential and scientific persons, in the form of an elegant *déjeuné*, all the items of which, with the exception of coffee, were prepared more or less from the potato; when a most satisfactory account was afforded by Mr. Rogers, of the different processes in their preparation, with much interesting information relative to the value of the potato itself, which, he very justly observed, is too much overlooked. Every one present was astonished at the rich treat provided on the occasion, which consisted of soup, stirabout, milk porridge, jellies, blancmange, Spanish flummery, and pastry of all kinds, made, as we have already stated, principally of the produce of the potato, either as meal, flour, or fecula.

After the gentlemen present had partaken of the various preparations, Mr. Rogers observed, that the preparation of the meal and flour from potatoes was so simple that it could be accomplished in the cottage of the poorest peasant. He then described the component parts of each food upon the table. The general proportion being one-half potatoes; some, however—viz., milk porridge, "Scotch bread," and rock biscuits—being entirely made from it; also the jellies, blancmange, &c., produced from the *pure fecula*, without animal matter of any kind—in fact, no addition but the usual seasonings. The soup also, which appeared to be a palatable and nutritious food for the lower classes, was stated to be made of a small quantity of bacon, thickened with meal of the potato, and which was capable of being made in a short period of time, at a cost of about one farthing per pint.

Mr. Rogers then alluded to the general impression as to the want of nutritive power in the potato, and deprecated the publication of statements which were founded in error, stating that there was "little, if any, nutriment in the potato." He contended that the nutritive properties of the meal and flour of potatoes were almost, if not entirely, equal to that of wheat; and then gave the following analyses of each, assuming the constituents for the support of animal life, contained in vegetables, to be starch, sugar, and gluten. When converted into meal, the potato contains—

Starch and sugar	84·8
Gluten	14·82
Oil	1·10
	100·

While wheat, converted into meal, contained—

Starch and sugar	78·20
Gluten	17·53
Oil	4·27
	100·

Thus showing that the difference between the gluten was but 2¾ per cent., while the starch and sugar were more abundant.

The difference between "*meal and flour of potato*," prepared as recommended, and "farina," was pointed out. Farina is the starch of the potato, taken from the fibre, and contains nothing beyond the properties of starch—while the *fibre*, which is thrown away in the manufacture of farina, is rich in animal matter and oil, and by being combined with the farina, or fecula, produces a meal, or flour, closely analogous to that of grain. This fact it was particularly necessary to bear in mind, in order to counteract the impression that there was but little nutriment in potatoes—a strange one, where so many millions lived on them as their only food.

A comparison was then entered into between the relative amount of food obtained from an acre of land, in wheat and potatoes. On this subject, Mr. Rogers stated that he did not rely on his own experience, but cited the authority of practical men as to produce, and of eminent scientific men as to the analysis of the respective crops, stating the following as the result of his inquiry:

	Starch & Sugar.	Gluten.	Oil.
1 acre of wheat	825lbs.	185lbs.	45lbs.
1 acre of potatoes	3427lbs.	604lbs.	45lbs.

Thus it appears that potatoes will produce of meal and flour, FOUR TIMES, nearly, in weight, what can be had from wheat—a fact not generally known, but which could not be contradicted. He begged to impress this startling fact on the minds of those who heard him, and hoped to rescue the potato from the calumnies thrown upon it. In an establishment such is the South Dublin Union Workhouse, containing from 1,800 to 2,000 persons, Mr. Rogers stated that from fifty to sixty paupers would be able to prepare, of potato meal and flour, by the simple means in operation, a sufficiency—say, four to five tons per week—for the use of the house, mixed with other meal—by which a saving would be made in the expenditure of the establishment of above £1,500 a year. He sat down amidst much applause.

Sir Robert Shaw, Bart., who presided on the occasion, expressed his astonishment at what he had seen, and at the statements made by Mr. Rogers, as to the nutritive properties of the potato, compared with those of corn, which differed greatly from the impression which had been hitherto on his mind on the subject. He would have supposed it impossible to put the potato into so many different forms as they had before them. They all owed great obligations to Mr. Rogers, for the handsome manner in which that entertainment had been put before them, and in the name of the guardians, he (the chairman) returned him thanks. He had brought most valuable information before them, which would be of great use, if disseminated through the country.

Mr. Rogers returned thanks, and, in doing so, observed that his great object was to render the manufacture of the potato general, henceforward, throughout the country—not alone for workhouses and jails, but that every poor cottier might be enabled to have his bread, his stirabout, and his soup, as well as his boiled potato—which could be done, by teaching the people a most simple process, capable of being carried on in every cottage in the country.

Considering the large and influential body of gentlemen before whom Mr. Rogers so successfully exhibited the good account to which our much-abused vegetable may be turned, it is to be hoped that some of them, at least, will further test the advantages which he held forth. No better expedient could have been adopted for showing the value of the potato, in a way not likely to be forgotten; and it must be remembered, that, although it was extraordinary circumstances which caused the matter to be brought so forcibly under public notice, yet under ordinary circumstances it cannot be questioned that a portion of the crop may be converted into meal, with great advantage, and be made the means of adding largely to the comforts of our peasantry.—*Irish Farmers' Journal.*

As a sequel to the foregoing remarks, and for enabling any one to judge of the crops best worth his growing, as well as for showing the comparative amounts of nutriment afforded by certain crops of corn and vegetables, we subjoin the following table of the average weight per acre of thirteen crops of corn or vegetables; and also of their organic or inorganic constituents, calculated by Edward Solly, Esq., F.R.S.

Average Produce per Acre.		Water.	Unazotized Organic Matter.	Protein Compounds*.	Inorganic Matter.
	lbs.	lbs.	lbs.	lbs.	lbs.
1. Turnips	25 tons, or 56000	51800.0	3309.6	442.4	448.0
2. Carrots	15 tons, or 33600	29433.6	3128.2	655.2	383.0
3. Parsnips	12 tons, or 26880	21542.7	4642.2	561.8	333.3
4. Potatoes	8 tons, or 17920	14228.5	3053.6	433.7	204.2
5. Barley	35 bsh., or 1800	237.0	1314.2	205.9	42.3
6. Oats	40 bsh., or 1700	238.0	1215.7	187.8	58.5
7. Peas	25 bsh., or 1600	137.6	1017.7	399.4	45.3
8. Beans	27½ bsh., or 1750	138.2	979.0	581.2	51.6
9. Wheat	28 bsh., or 1680	243.6	1184.4	248.4	33.6
10. Cabbage,	10000 plants or 80000	73840.0	4184.0	1456.0	524.0
11. Jerusalem Artichokes,	500 bsh., or 28009	22176.0	4888.8	599.0	336.0
12. Beet	 75000	65850.0	7312.5	1020.0	817.5
13. Buckwheat,	30 bsh., or 1300	162.5	94.52	177.5	17.5

* "Protein compounds" form the nutritive portion.

MALT TRADE.

COUCH CASE AT CROYDON, SURREY.—May 30, 1846.

Before the Magistrates, Messrs. SUTHERLAND, LUCAS, HEMMIS, and SIMEON.

Mr. F. Shaw attended to answer an information laid against him at the instance of the Board of Excise, charging him with having unlawfully packed and compressed the grain in his couch, for which offence he had subjected himself to a penalty of £100, 7 and 8 Geo. 4, cap. 52, sec. 32, 33, and 34.

Mr. R. Russell, solicitor, of Croydon, appeared for defendant.

The evidence of the Excise officers went to prove that on the 6th April they attended the malthouse of defendant at Croydon, and gauged the contents of the couch that had just been thrown from the cistern, and found it to contain 129 bush. 3-10ths; but, as the grain appeared to be more closely packed than it ought to have been, they ordered it to be replaced in the cistern, and then again turned back into the couch; and, upon gauging it the second time, ascertained the quantity to be gross 139 bush. 6-10ths (subject to a *reduction* of 5 per cent.) Under these circumstances the defendant was now charged with having unlawfully packed and compressed his couch.

In the cross-examination the officer said he never had cause of complaint against defendant; had been present at previous emptying of cisterns in defendant's malthouse, and never objected to the manner of emptying, which was very different from the manner the couch was filled by order of the generals. Upon the examination of the superior officers, they said they did not allow the man to THROW the grain the second time into the couch in his own way, but compelled him to empty the corn from cistern into couch in *two cones* just inside the couch, and then they (the officers) levelled it by raking the corn lightly all over the couch. They admitted that by this process a greater quantity of air was allowed to remain between the grains, and that therefore, to some extent, they gauged air instead of corn, when they found the increase. They likewise admitted that as the maltsters threw the corn with some force *levelly* all over the couch, the air would be excluded, and the grain be much closer, and consequently not gauge so much in quantity. But they said the *excise authorities considered it illegal* to throw the corn levelly from the cistern into the couch, and produced a printed document to the magistrates, containing instructions to them (the officers) how to fill a couch; but, upon being asked if that was put in as evidence, and if those instructions were a legal document from the act under which the maltster carried on his business, the said document was withdrawn, admitting the act or law gave no such instruction.

It was further admitted that no artificial means of pressure had been resorted to, and that the method adopted by them (the officers) was the most ingenious that had been devised of getting the greatest quantity of air amongst the grain, and thus increasing the *apparent* quantity in the couch.

It appeared likewise in evidence the couch was only 10 inches 7-10ths *deep,* and that the officers, in levelling, made a *variation* of no less than 1 inch 7-10ths; the lowest being 9 inches, and the highest 10 inches 7-10ths; that had the maltster at any time levelled his couch so irregularly, they should have complained. That every inch contained 12 bush. 8-10ths.

Mr. Russell, on behalf of defendant, urged that it would be monstrous to suppose the act of parliament was ever intended to apply to such a case as this. The defendant was charged with packing and compressing the grain; and he submitted that the act was only intended to apply to cases where *artificial means of pressure were resorted to*; and not as in this case, where the only offence appeared to be that the grain was thrown into couch in the ordinary way practised by the whole trade, and not in the artificial manner practised by the excise officers and informers. The maltman was then examined to explain the manner the officers compelled him to return the corn into couch, viz , in two cones, and not to throw the corn in, but let it run off the shovel gently. He never saw a couch so filled, and had never been found fault with before either by officer or supervisor.

Mr. W. Ford, maltster, was then examined at some length by the magistrates, to show the ordinary business way of performing the operation of filling the couch; he had been practically engaged in the malt trade twenty-six years. The defendant, Mr. Shaw, was his first foreman in 1820, but was now malting for himself. He (Mr. Ford) had never seen a couch filled as practised by these officers; if any of his men had so done, they should never fill another for him. The practice he had followed, and still did, was to cause, as near as possible, every shovel of corn, as taken up in the cistern, to *be thrown into its proper place in the couch*, causing as little raking as possible. It was an important object in malting not to allow more evaporation of moisture in the operation than possible, particularly in the earlier stages, it would consequently be injurious to knock and rake it about as described, causing great loss of moisture by evaporation; and they were not allowed to add more moisture until the expiration of one hundred and forty-four hours *after* emptied from cistern. He malted one house, 1844, in which the cistern and couch were so placed it would be *impossible* for men or officers to fill the couch as described by them, the cistern being 203 inches long, and the extreme end of the couch 280 inches from the end of cistern, walled up on each side. He malted principally upon commission for brewers, at so much per quarter, in some cases including the duty. It was of great importance to him this question should be set at rest, for if the officers' mode of filling the couch was to be made the law, his contract price must of necessity be advanced at least eleven pence per quarter, equal to nearly five per cent. upon the duty.

The bench, after consulting some time, dismissed the information. The excise officers then gave notice of appeal.

For some years the malt trade has been in comparative ease; that is, free from much vexatious annoyance from informers, &c.; but within the twelve months last past a regular crusade appears to have been entered upon against the maltster, to obtain convictions and penalties under the absurd couch clause; which, if construed literally, makes the magistrates little more than a set of automata; and, up to the present time, they have so felt their hands tied by the wording of the clause, that upon the bare fact of excess being sworn to, in cases where that excess has not exceeded one peck in two hundred bushels—value not eight pence—they have reluctantly convicted, repeatedly following the conviction with these words:—" We do not believe *that fraud has been either committed or intended.*"

But these informers and excise officers, by the most dexterous manipulation of piling grain upon grain, cannot fail in obtaining an excess. I have reason to believe there has been more information against maltsters the last twelve months than for the previous twelve years. But the *extremes* to which the travelling officers and informers have gone have enabled the trade to place the question in a new light before the magistrate and government; and, I think, to relieve the trade and head officer from much further vexation and annoyance.

The words of the act bearing upon this question are these only:—" And be it further enacted, That every maltster, or maker of malt, who shall empty, or take any corn or grain from or out of the cistern, shall empty all such corn or grain into a couch frame or frames entered by such maltster or maker of malt.

"And all corn or grain emptied into such couch frame or frames as aforesaid, SHALL BE LAID AND LEVEL THEREIN by the maltster or maker of malt.

"And if any maltster or maker of malt who shall empty or take any corn or grain from or out of any cistern or cisterns, shall not empty all such corn or grain into such couch frame or frames entered by such maltster or maker of malt, *or shall not lay the same flat and level in such couch frame or frames*, every such maltster or maker of malt so offending, shall for every such offence forfeit and lose the sum of one hundred pounds.

" And be it further enacted, that when any officer of Excise shall suspect that the corn or grain making into malt in any cistern or couch frame has been trodden or forced together, or that the corn or grain so making into malt therein is so hard, close, and compact, as it could not have been unless the same had been by some means or other trodden or forced together in such cistern or couch frame, it shall be lawful for such officer to direct the maltster or maker of malt or his workmen and servants to throw all such corn or grain from and out of the cistern or couch frame, and for such officer, and any person or persons in his aid or assistance, which aid and assistance the maltster or his workmen and servants shall also give if required, to return *all* such corn or grain into the cistern or couch from which the same shall have been thrown, and to lay the whole of such corn or grain level again in such cistern or couch, and if any increase shall be found in the gauge or quantity of such corn or grain after being returned into and laid level again in the cistern or couch frame over and above the former gauge taken before the same was thrown out in any greater proportions than those of *five* bushels in every *one hundred* bushels previously to such corn or grain having been emptied *eight* hours from the cistern, or *six* bushels in every *one hundred* bushels if such corn or grain shall have been emptied from the cistern *eight* hours and not emptied *sixteen* hours, or *seven* bushels in every *one hundred* bushels, if such corn or grain shall have been emptied from the cistern *sixteen* hours or upwards; the increase so respectively found as aforesaid shall be deemed conclusive evidence of such corn or grain having been trodden or forced together, and the court of justices before whom such evidence shall be given, shall thereupon convict the maltster or maker of malt in the penalty imposed by the said recited act of the seventh and eighth years of his said late Majesty's reign; and every maltster or maker of malt who or whose servants or workmen shall, when directed by any officer of excise, refuse to throw out any corn or grain making into malt from any cistern or couch, or to aid or assist in returning the same into the cistern or couch from which the same shall have been thrown, shall forfeit *one hundred* pounds: provided always, that it shall be lawful to prove by any other or different evidence that such corn or grain had been trodden or forced together."

What then do these enactments direct? 1st. That the corn shall be laid level in the couch frame: if he does not lay it flat and level he is fined £100. 2nd. If the officer shall suspect the corn has been trodden or forced together, he shall throw or caused to be thrown out the corn from the couch, and return the same *level* in such couch.

Now these two points divested of all technicalities constitute all the law and regulation upon the question in dispute, and these resolve themselves into one, viz., What is the fair business way that the corn should be placed into the couch? The trader, for two good and sufficient reasons, throws his corn, from cistern, into his couch solid. The two reasons are these: first, to avoid paying more duty than he steeps barley; and, second, by thus laying his corn close, and not allowing the corn to separate more than possible in the operation, he prevents that evaporation of moisture which a contrary mode would cause. In proof that the trader is correct, if there was *no* duty, he would perform the operation as he does now. In further proof of this statement, I will adduce a case in point.

The maltster, Mr. Shaw, whose case I am now treating, left me in 1823, an excellent offer being made him to take the management of malting in France, where he remained 7 years, with credit to himself and satisfaction to his employer. There being no duty or restriction there, he followed that system most conducive to the making a perfect malt, in doing which he of course studiously avoided dissipating the moisture in the young stage, consequently threw his corn, from the cistern into the couch frame, as firm as possible.

The object of the trade in requesting me to print this report is, that all may be acquainted with the main points which caused the magistrates to dismiss the case in favour of the maltster, forming a precedent for future cases, and it is hoped it will induce the Board of Excise to put a stop to the vexatious proceedings of their officers, by issuing orders of a more liberal and business-like character. In fact to confirm the opinion of the magistrates in this case, viz., that the corn shall be thrown into the couch in a fair business-like manner.

As this is a question equally important to every maltster in the kingdom as to Mr. Shaw, the trade generally are requested to contribute towards the expences attendant upon the defence of this information, by forwarding subscriptions to R. Russell, Esq., Sol., Croydon; or to Mr. W. Ford, Maltster,

Fulham, near London.

DORKING FARMERS' CLUB.

ON THE BREEDING, REARING, AND FATTENING OF STOCK.

The monthly meeting of this club was held on Tuesday, May 12. There were present, Lee Stere, Esq., president, C. Barclay, Esq., E. Kerrich, Esq., B. Fuller, Esq., T. L. Thurlow, Esq., J. Savage, Esq., R. Goldhawk, jun., Esq., Rev. F. Barlow; the Messrs. Hubbards, Norfolk; Mr. Dodds, Scotland; Messrs. Wilson, Tidy, Rose, Baxter, Cummings, S. Bothwell, S. Bothwell, jun., A. Bothwell, Crewdson, Wells, J. Bartlett, jun., J. Dewdney, Pattison, and S. Page, secretary, &c., &c.

The Chairman, after apologising for the presumption of so young a farmer as himself giving his opinion on so important a subject, commenced his address on the breeding, rearing, and fattening of stock. Before entering into the subject, he would just remark that upon almost every arable farm the breeding and rearing of stock ought to be considered as important a branch of the business of the farmer as the cropping of his land. He did not mean to say that it should occupy his (the farmer's) attention to so great an extent as if he were a grass farmer, but he did say, if the arable farmer meant to make his land pay as it ought, as in almost every instance it is capable of doing, if rightly managed, he must rear stock. He should so dovetail, as it were, the two branches together, as to make each play systematically into the other's hands, and thus make the whole business pay in a tenfold degree. And it would be his (the Chairman's) business to shew them presently how, by the new and enlightened method of farming which had been so clearly pointed out to them during the last few years, we may actually do this without the assistance of what was formerly considered indispensable to the breeding of stock, the advantage of an extensive run at grass. Now, as a matter of course, every farmer thinks it necessary to keep some stock on his farm, but what description he keeps, it appeared to him (the chairman), he was generally careless of, so long as he gets it cheap in the first instance, and of a sort which he thinks will do upon the roughest farm. Now this view of the case may be plausible enough at first sight, but how short-sighted it was in the end. Does it not stand to reason, that the higher bred the parent stock is, independent of its being more valuable in itself, the more valuable must be the stock it produces; for the better bred an animal is, as a general consequence, it will be better shaped, and the better shaped it is, the less food will be required to keep it in condition; and from experience, he (the chairman) would venture to add, that it would thrive better upon bad food, than any cross-bred description you can find, however hardy at first sight the rough looking animals may appear to be. Having stated that farmers ought to keep only well-bred stock, the next point was what breed that stock should be. It would be sufficient to mention there, perhaps, the three most prominent ones, as generally exhibited at public shows, as he (the chairman) presumed, he did not dare to mention in a leading way the poor despised Sussex stock, as that is not allowed by the judges learned in such matters, to be a breed in itself, though he must presently introduce it to them, as it happened to be the sort he kept himself. The three sorts he would mention were the "Short-horns," the Herefords, and the Devons, each desirable according to climate and soil, and upon the consideration of these the herd should be formed, but, perhaps, they agreed with him in selecting the Sussex as the best for their particular locality, for the reason he should presently notice. They would see he did not wish to lay any particular stress on what sort they should select, so long as they kept a good one. Setting aside their fancy for colour or anything else, among good sorts the aptitude to do well as it is called, will be the same in each, either in the straw yard or the fatting stall. The speaker then gave his reasons why he selected the Sussex stock to breed from. He had been thrown from circumstances into the society of Sussex farmers, and when he had been trying to hold up his favourite stock, which was the Short-horns, he was always told he would soon find out his mistake, and when he saw that nothing would go down but Sussex breed, he pocketed his love for his favourite Short-horns, and remembering the old saying, "When at Rome, do as Rome does," he proceeded to purchase some of the best Sussex cows he could find. From the great difference there existed between the true bred sort, and the general run of animals about the county, which were called Sussex because, he presumed, they happened to be of a red colour, he felt bound to mention some of the excellent and interesting qualities, the really true bred ones possessed. Those persons who have never been in the eastern parts of the county, can scarcely imagine the size and perfection to which the stock is brought in that district, and the value of them to the farmer in the tillage of his land, from the kindliness and patience of their nature, in every species of work that in most other counties is performed by horses; thus amply remunerating the farmer for his keep during almost the whole period of his growth, and at the same time becoming in their work so much the better for their progress of fattening. He was aware that in this respect the Devons also were famous, but an experiment had been tried with them as to their several qualifications as workers against the Sussex, and the latter have proved themselves superior in every way, both as to pace, trueness of step, and hardness of constitution, under all sorts of severe work or hard keep. Allowing therefore that they are not so perfectly symmetrical as the Short-horns or Herefords, he thought they could not but look upon the breed with admiration and regard, neither could they be surprised at the Sussex men being proud of their stock. Their stock is also much liked by the butchers, who consider them to "die bright and well," as it is called. He would now speak as to the most remunerating kinds of stock, proceeding to explain his method of rearing it. In doing so he must step rather out of the routine of his subject, as his system was so blended together with his other branches of farming. He would take the opportunity therefore of detailing how, by experience, he was convinced that an arable farm may be made available in rearing a considerable quantity of stock, without the assistance of large pasture fields. The first thing he looked to in breeding—having stated that the present stock must be good—is to have his calves dropped as soon after Christmas as possible, being fully convinced of the importance of an early start, as being a grand point gained towards making a good one in other respects. There may be exceptions, but he was certain the rule ought to be, breed early. He then allowed the calf to be with its mother for 7 or 8 days, when it was taken away from her entirely, and was put upon a diet of warm skimmed milk, with a certain quantity of sago thickened in a little more milk, and then mixed all together. The quantity of milk given at each meal is about 3 quarts, and of sago, 2 table spoonsful—night and morning. Why he fed with sago was on account of its consisting principally of starch, and forms the best equivalent for butter, and as the future health of the adult depends upon the treatment of the young, he thought they could not do better than follow nature as closely as they could, who had pointed out, in the milk of the mother, not only the proper food of the child, but also had exhibited in it, the model after which all food should be prepared. Now as to the expense of the sago, it is really almost too trifling to mention, and yet as it had been said that he was so successful with his calves, because of the great expense he was at in feeding them, he would just tell them, (the meeting) that the price of cattle sago in that town is 2d. per lb., and in a pound there are 17 spoonsful, which comes to something like a ½d. a day, or 3½d. per week. So they might soon calculate the whole cost of a calf for one season, when he told them that he continued that diet for 3 months afterwards. The other kind of food he gave them was, a little hay chopped, some pollard, and a few white carrots, and according as he thought their stomachs would bear it, he mixed with this food a small quantity of his cattle compound. Nothing but the sago is bought for them, all other changes of food from that time forward are entirely from the farm. The commonest farmer might keep his calves precisely in this way, if he chose to take the trouble. He positively declared that there was nothing expensive in the whole system: attention, regularity, and cleanliness forming the principal secret. The place where the calves were kept the whole of the time was nothing more than a good sized pig-stye, and they ate their food, out of a common wooden hog-trough. He mentioned these particulars because it was his determination not to farm in what is generally called the expensive style of a gentleman, but merely, though thoroughly, as he thought every tenant farmer ought to farm; and if by so doing he should chance to make a fortune at it, perhaps his neighbours would forget he was a gentleman farmer, and follow in his steps. He would now go to the question of what number of animals are to be reared on an arable farm; because the calves, after three or four months in the pig-stye, must go somewhere, and the yearlings or two yearlings must also be somewhere, and all must have something to eat, and be kept too in a growing way, for poor stock will starve a farmer, whilst thriving stock will enrich him (*cheers*). It must be done by an entire new system of cropping the ground. For instance, for summer feeding, instead of having your land idle in a naked summer fallow, you must have the whole or greater part of such ground covered with a flourishing crop of tares, sown so as to succeed each other in the order in which they require to be mowed off, and then carried into your yards where your stock ought quietly to be, and where they will be constantly manufacturing manure, which in return for the tares you will carry back on the fallow, and which combined with the stalks and roots of the tares left in the ground, would, he would venture to say, give a better crop of wheat at the following harvest than ever they saw in the same ground before. For winter feeding your young stock you must take care to grow roots of some description. It is now known that both swedes and the white carrot can be grown on any land; they can be forced at a very trifling expense in the first instance, by means of some artificial dressings, and when they had got them they would find them a mine of wealth, and teach them how stock could be kept well upon a most trifling quantity of hay, and that hay even of inferior quality. Of course, they should grow roots enough to last till the green food came in. He would wish it to be understood that these remarks were principally addressed to clay farmers. Then for fattening their stock—presuming that their system had been to sow seeds in their wheat—instead of having the whole layer so sown, at least half should be planted with beans and peas, and no ground should lie fallow, as he called it, even in an old clover lay, but should be planted with some crop for stall-feeding. In heavy soils, if the land was properly cultivated, he was sure beans might be grown extensively, and on lighter soils the farmer would have his barley and peas for fattening. By these means of growing a plentiful supply of food for cattle at all seasons of the year, he maintained stock might be both bred and fattened on the produce of an arable farm. Upon this system their horses and carters will be doing their regular farm work, and getting together at odd times, mould for mixtures or horse-hoeing, and occupying the land as it may want, instead of travelling along the road for lime, which he must still maintain was very little of a fertilizer to the soil; though, in some particular instances, like sugar on a twelfth-night-cake, it may help to sweeten it (*laughter*). He dared to say that it would appear to many persons, that in this plan of his for rearing horned cattle upon an arable farm, he was totally unmindful of sheep; but it was not so, for his intention was to keep them in the same way, that is, under sheds and in close quarters, upon which plan he thought he could see pretty clearly how sheep might be kept to pay on a clay farm, all the year round; but he believed it was not expected that he should make any mention of sheep, under the head of breeding and rearing stock. They now came to the fattening of cattle, and he before mentioned his opinion of the importance of having a good breed of cattle; it was scarcely necessary for him to mention any particular qualities. The proper signs would be generally recognized quickly, but there was one point that every breeder should insist upon, and that is, that the animal should have a "mellow feel." That is of all signs, perhaps the most favourable one of the aptitude of an animal to fatten. Now, the food he had fattened upon, had created, he believed, a great deal of discussion for some time past amongst the farmers of his neighbourhood, but he had never heard one of them say, upon talking the matter over with him, or upon seeing his cattle fattening upon it, but what it was the best stuff they ever saw; still, he thought there was scarcely one person who followed the plan, and therefore he was afraid he should state his case with very little support, and perhaps without much credit for the value of the system. One charm indeed it ought to possess in the minds of every reasoning person, and that is, that it takes very little money from the pocket of the farmer, almost the whole of the food being grown upon the farm, and of course gives its return back in the shape of good manure. There are no bills for oil-cake, or other stimulating food, generally purchased of the foreigners, but the whole system is worked upon and through the farm itself, and this in an indirect as well as a direct way, not only benefiting the farmer, but the whole country at large. He had called it *his* plan, but they were to understand that he was not the originator of it. The credit of it was due to Sir Charles Burrell, who lived not many miles from there (the place of meeting). His friend Mr. Barclay, and himself, had been honoured with an invitation to visit Sir Charles Burrell, and see the effects of his compound in fattening stock, and he (the speaker) must say he never saw finer specimens. So pleased was he with what he saw, that he has ever since adopted it with the most perfect success, in the fattening of his stock. The compound consisted of bean-meal, linseed, and water, boiled into a pudding. The quantities were as follows:—63 lbs. bean-meal, 21 lbs. of linseed, and 156 lbs. of water. The weight of this was 240 lbs. After boiling, however, the mixing would lose 13 lbs., and the weight of the compound when made would be 227 lbs. The value of a bushel of beans of the average weight of 67 lbs. was 4s. 6d.: and a bushel of linseed of 52 lbs., 7s. 2½d.; 63 lbs. of beans would therefore cost 4s. 2½d., and 52 lbs. of linseed 2s. 11d., making a total of 7s. 1½d. for the 227 lbs. of compound, which would give one bullock 12 lbs. for nineteen days, at 4½d. per day. Three oil-cakes, that is 9 lbs. of linseed cake per day, is considered moderate feeding, which will cost 9d. Twenty-four pounds of compound may be had for the same money. Therefore 24 lbs. of compound may be given at the same expense as 3 oil-cakes per day. But beasts have done extremely well on 14 lbs. of compound a day, and this will leave a cost difference of 2s. 4½d. in favour of the compound. The grinding of the beans, the requisite fuel and labour, are set against the expenses of the carriage of the oil cake. The time which he calculated it took to make the compound was about an hour and ten minutes. Now it was no doubt all very easy for many farmers to talk of time and trouble it took for such things as making this fattening pudding, but the time and trouble of making such great improvements as this was, never entered into his mind. This compound was not only successful in fattening the peculiar breed he introduced to their notice, but equally so with all the other sorts of animals. He would be happy to shew any farmer who liked, his stock in the course of fattening. The President concluded his able address amidst much applause.

Mr. R. Goldhawk corroborated the statement of the president, of the manner in which calves thrived on sago, and agreed with him that that food very nearly resembled the mother's milk. He had tried the compound too, and found it prove very successful. He had fed milch cows on it, and found it cheaper than, and equal to any other kind of food for them. He had fattened 20 beasts on it last year and considered he had saved £3 each by fattening them on compound. Last year their was a scarcity of roots, a difficulty they had not found this year. He considered that beasts did not do so well on roots with the compound, as they did upon hay and the compound. He had tried making the compound with barley and fine pollard, when their stock of peas and beans run short, this required more water as the pollard absorbed it in a greater degree. The extra water depends upon the quantity of flour the millers gave with their pollard (*laughter*). With regard to linseed he had last year grown some for the first time, on a four-acre field, after potatoes and mangel-wurzel. The pulling of it was rather a tedious process, but he was very well pleased with the experiment. He grew twelve sacks on the four acres; setting the flax against the fodder he had £30 to stand against the £5 worth of barley and the loss of the feed. He was so well pleased with the result that he should grow a greater quantity this year. After the linseed he grew wheat, and it was looking very well. He had only applied a common dressing before the wheat was sown. He perfectly agreed with Mr. Lee Stere in his plan of green cropping, by which means stock could be reared on arable farms; and he believed too, more manure was made in the yard than when the beasts were turned out. He thought the plan of Sir Charles Burrell in box feeding was very good, but the obstacles in the way of its adoption were the expenses of getting boxes, and the alteration of the farm buildings.

Mr. Lee Stere said, the estimated cost of the boxes was only 15s. each, and could be made out of pig styes.

Mr. Barclay said they must be royal pig styes then. He understood the dimensions were 13 feet by 10—without the troughs.

Mr. Goldhawk resumed. Their chairman, he was bound to say, deserved great credit for the way in which he fed his stock at such little expense, and he was sure nothing could be done more clearly or admirably. He (Mr. G.) had seen some beautiful beasts among his Sussex stock. For his own part, however, he had some little preference for short-horns. Herefords were, however, considered by some the best stock for an aptitude to fatten; it was certain the butchers were fond of them, but the difficulty with the farmer was to get them of a pure breed.

Mr. **Barclay** thanked the president for his able address. The club were greatly indebted to him (*hear*). No one had such perfect success as their president in the management of stock. The experiments which he (Mr. Barclay) had made with the compound had not been so completely successful. The speaker then detailed some little experience his brother and himself had had in the purchase of the short-horned breed; and speaking of milch cows, he said he remembered on one occasion 120 guineas was given for a cow from Nottinghamshire, for the sake of the milk. He had a relation in that county who had told him it was not the custom to take the calves away from their mothers, but let them run with them, and take all the milk. The farmers in early days took to the Galloway breed, afterwards they tried the short-horns. They found these fatten faster than the other, but the cows did not give so much milk. They were now getting back to Galloway in a great measure. In some counties they were aware they turned out their cattle, and managed to fatten them on grass, but that was only were the land was particularly rich; they must not attempt that in their county, their land was not good enough. Then with regard to the different kinds of stock, the Devon were a nice looking animal, but butchers did not like them very much, they complained they did not die well. Some farmers, he had understood had a cross between a Devon and a Galloway, which was considered a very good animal. In feeding animals if they used compound he thought roots were not good to give with it, he considered chopped hay was better. The speaker then noticed the respective advantages of swede turnips and mangel wurzel where cattle were fed in yards, and urged the importance of the farmer keeping a warm and sheltered yard for his beasts. He then alluded to the relative costs of oil cake and compound, and stated that on one occasion, having some barley so bad that the maltsters would not buy, he used it in feeding stock, and found it answer pretty well. He gave them some roots with it. The animals which were exhibited at the shows for prizes, they would remember, were fed on all descriptions of food, as hay, roots, oil-cake, barley, &c. Mr. Drummond, who gave the lecture at Guildford a week or two ago on agricultural chemistry, says that as cattle are ruminating animals it is necessary to give them hay or something of the sort, upon which they can ruminate, and not oil-cake or compound exclusively, or they will not thrive well. Mr. Barclay then alluded to the advantages of feeding stock in moveable sheds, similar to those used by Lord Ducie, and then entered into a comparison of the respective advantages of the Alderney and Norfolk breeds for the purposes of the dairy. The milk from the Alderney cows was richer than that from the Norfolk. On the surface of a given quantity of milk, from each there would be about two inches of cream from the Alderney, and only one inch or one inch and a half from the Norfolk. There was some peculiarity, however, in the Alderney cream, for it was found that it did not make quite such good butter alone as the Norfolk, while beautiful butter was produced by mixing the milk.

Mr. **Goldhawk**, in alluding to the remark of the chairman respecting the working of oxen, stated that he always commenced working them young and found great advantages from it—a horse, they knew, wanted breaking in while he was young, and it was the same with beasts. He had found the animals worked a great deal better when they commenced young. He found three of his oxen could easily do the work of two horses. Some of the farmers had said when they had seen his beasts going to work, what are you going to do with those little calves ? but he had always challenged to match them against their older beasts for pace and regularity. He must tell them, however, that it would not do to turn the workers out into a pasture, but to keep them high, as they would do a horse that they wanted to thrive and do his work. He began to work them when about three years old, and kept them at it till six or seven. He had understood Mr. Lomax kept them for fifteen or sixteen years, but that was too long, as they were not good for the butcher afterwards. With regard to food for milch cows, there was nothing equal to boiled barley. A gallon of barley should be boiled in an equal portion of water. Before the investigation ordered by government, he had considered that malt was not so good as barley for fattening cattle, as malt, in making, must lose some of its nutritive properties. The speaker then alluded to the time which it took to make the compound. When he had made it, instead of taking absolutely an hour and ten minutes, it took ten minutes to put it in the copper, and the same time to take it out, making twenty minutes—in the interval of boiling the men went about other work. Without being acquainted with the chemical test, his impression was, that in feeding cattle upon root crops there was a tendency to breed muscle, but not fat. The reverse with the compound.

Some conversation then arose about the relative value of the different roots in feeding stock, Mr. Barclay observing that in Norfolk the impression was, that they got on better with mangel than swedes, and with round mangel better than long.

A further conversation then ensued on the advantages which were derived by allowing the cottager to grow root seeds for the farmer. It was profitable to both parties.

The CHAIRMAN then said, with regard to the time of making the compound, it was pretty nearly what he had said, to make it properly. It took twenty minutes to thicken the pudding. Now, as they were many of them aware he had the honour, formerly, of being a master of hounds, and he used to pay great attention to their diet, looking after it personally, he therefore flattered himself that he could make a pudding (*laughter*). He then enlarged on the advantages which he had experienced from using the compound. He was certain that a beast could be fattened on it in three months, that would take four by any other description of food; and it would be a great advantage to the farmer if he could fatten four beasts in the year, instead of three. He had known two beasts, which would not have fetched more than £4 10s., and after a little feeding off the pudding, had been jumped at for 12 guineas. As to the rearing of calves, he would challenge his against those who let theirs run with the cow, and he got the milk in addition. He did not mean to say he had been particularly successful in the produce of his dairy, for he only treated it as a secondary consideration, but taking one year with another, he had realized £8 a year profit, while he believed those who considered it of primary importance, thought £10 a year a good average.

After some remarks upon the best time for weaning calves, the meeting adjourned till June 9th.

ON FEEDING CATTLE WITH MALT.

SIR,—It appears to me that a great advantage would be conferred upon the consumer of meat as well as upon the farmer by a repeal of the duty upon malt. I have caused to be given to a beast daily seven stone of turnips and six pounds of ground malt, with as much straw as he will eat; in the event of potatoes being substituted for turnips, not more than three stones and a half of them ought to be given. If the farmer were allowed to adopt this plan, the advantages to him would be that he would have a use for all his small corn, both wheat and barley, and that he would be enabled to make a better sample to be carried to the market; that this process of fattening will be both cheaper and quicker than those which have been usually followed by the most spirited farmers; and that a given quantity of turnips or potatoes will fatten a greater number of cattle. Sir R. Peel's attempt to lower the price of meat seems to have been a complete failure; for about six months after the passing of the bill in 1842, which allowed foreign cattle to be imported, an idea prevailed that meat would be cheap, and cattle were hurried into market at low prices; but I ask whether any person who calmly reviews the prices which have been paid since that time can gravely say that Sir R. Peel has ground for boasting that his measure has been attended with success. It cannot be denied that a number of foreign cattle, denominated fat, have been introduced into this country; but unless the number of cattle imported exceeds that of home supply diminished, there is no gain to the consumer. Sir R. Peel's policy may have injured the English farmer without having benefited the consumer. I believe many farmers have ceased to feed cattle from the apprehension that they will not yield a profit. I know of two farmers within a mile and a half of my residence who have given up feeding. I am happy to see that the question of feeding cattle with malt has attracted notice, and that it is likely to be further investigated. I would recommend to gentlemen who consider this subject of importance to make experiments with such accuracy as to ascertain the precise effects of malt. My knowledge on this subject is scanty, but I shall have pleasure in answering any questions and in imparting any information I possess.

It appears from the order given at page 3 of the Report from the Government Commissioners upon feeding cattle with malt, that farmers have the privilege of steeping barley to feed cattle without paying duty. I am unable to say what the difference will be found to be in the feeding qualities of steeped barley and malt; in the case of steeped barley the first process only of malting is performed, viz., the budding; it is prohibited to dry the grain on a kiln. It seems to me that malt acquires a feeding quality from the change which the grain has undergone, and from saccharine fermentation having taken place.

I cannot find language sufficiently strong to condemn the plan of Great Britain paying her own taxation, and contributing towards the discharge of the taxes of other countries, which will be the case if the proposal of Sir R. Peel is adopted. The United States of America will levy a duty upon British goods, but the British government will levy no duty upon American corn imported into this country; other countries in the same manner will turn this wrong-headed policy to their own advantage, and will recruit their resources at the expense of the people of this country, and the working classes here will never have either beer, or tea, or sugar, except as articles of luxury at an extravagant price.

SAML. CROMPTON.

Wood End, Yorkshire, June 11th.

AGRICULTURE ON THE RHINE.—IRRIGATION.

"Although the manure obtained from towns is of the greatest value in increasing the yield of meadows, yet it is important to make the fact known, that simple water, unaccompanied by the wash of floods, or by any extraneous matter, promotes the growth of grass on meadows in a remarkable manner. The meadows of Siegen, allow the peasants to give all their dung to the arable land, which, in its cold bleak situation on the sides of the hills, would, on other terms, not be worth cultivating. The whole agricultural plan of this district thus combines whatever can be of use to a half-manufacturing population, by demanding little labour, and producing chiefly what assists the miner, or serves as fodder for beasts of burthen.

"The water-meadows are now systematically laid down in three different manners according to the slope the ground commands, and the abundance or scarcity of water. The engineers are usually the peasants of the neighbourhood, who by practice have acquired great skill. The surveying instruments may be seen in their houses in all the villages, and the precision with which their levels are taken and the flow of water promoted is not a little surprising. The three modes consist in terraced beds and in broad and narrow beds with an elevated ridge in the middle. The following are the directions given by the *Oberförster Vorländer*. The chief canal should be carried as high above the level of the meadow to be irrigated as possible. Where circumstances do not favour the laying down of the canal at a sufficient elevation, and the soil is too soft to allow of the construction of a high dam without great expense, the level of the meadow may be lowered sufficiently to answer the purpose. It must be kept in mind, that by constant watering the level of the meadow is raised in time, for the soil swells in consequence of the accumulation of roots and the addition of particles of humus, as well as from the depth to which vegetation is promoted. When the surface reaches the level of the water-course from which it is irrigated, it becomes necessary to break up the meadow and to lower its surface. The mode adopted either to alter the level or to regulate the unequal surface of a meadow, is not to plough up the ground and crop it with corn and potatoes, although one would expect to obtain rich returns, especially of oats, from a lay of 16 or 20 years' standing. The sods on the surface are pared off with a peculiar kind of narrow spade 2 feet 2½ inches deep. Strips are previously cut in the surface with the axe, and the strips when rolled up are carried on a stick passed through the middle of the roll. One man usually marks the strips, two pare them from the surface, and a fourth rolls them up. These rolls are recommended in the place of square or oblong cuttings; amongst other advantages they insure a sufficient quantity of sod to cover the field when it is levelled. If the turf be cut off in small pieces, the quantity often proves somewhat deficient. The beginning is generally made with those parts of the meadow which being highest have the greatest quantity of ground to spare, and with those which are hollow and require filling up. The turf being removed the ground below is dug up, and carried from the one to the other. Care is, however, taken by good meadowers not to carry away the soil that lies immediately under the turf paring. Of this a portion is reserved to form the bed on which the turf is to be relaid. The ground transferred from one place to another is taken from the subsoil, unless the good ground be very deep. When the level of the whole meadow has to be lowered, the stuff taken from the subsoil that becomes useless must be carted and thrown away.

"Where the surface, at a sufficient depth under the chief water-course, still offers a fall of 1-36th of the length of the meadow, and there is plenty of water, the meadow is laid down in what at Siegen is called the terrace mode of irrigation (Hangbau).

"If the slope is less, and there are marshy spots, the meadow is laid down with narrow ridges.

"Broad ridges are used where water is not abundant at all times, and the ground free from marshy spots, but commanding little fall. Where these peculiarities of site, and command of water are observed, the yield of a water meadow on an average is the same in all three systems of laying down. The first cut is made about Midsummer, and on good soils gives 3 tons of excellent hay to the morgen, or 4½ tons to the acre. The after-grass yields about half as much. On average soils the yield may be estimated for the neighbourhood of Siegen at 3 tons to 3½ tons per acre. With retentive subsoils the meadows yield below the average. It is customary in autumn to drive the cows on the meadows, their weight being supposed useful in treading down the surface, which has a constant tendency to swell and grow over the level of the irrigating canals. These meadows furnish in autumn pasturage, and in summer the cows are driven into the 'Hauberg.' In the morning and evening some green fodder is given them in the stables. In winter hay, straw, and chaff, mixed up and boiled with potatoes, carrots, or beet-root, form the usual fodder.

" *Terraced Meadows.*—In the meadow that is destined to be laid down on the terrace plan, the water-course being carried over the highest part, the level of the distributing canal must be marked by a stake driven near the centre. Another stake driven at the lowest extremity of the field must mark the level of the draining conduit—the terraced meadow being supposed to have a breadth of 6 Prussian roods of 10 feet, and is divided into four beds each 1½ roods in breadth. The channels, laid parallel to the distributing channel are supplied with water from the distributing canal by means of transversal cuttings. It may seem simpler to let the water at once run over the whole surface from the distributing canal; but experience has shown that the richest grass springs nearest to the canals, although the reason why there should be a difference where there is water enough to flood the whole surface is not very apparent. By increasing the number of canals the fertilising principle is more equally distributed, and terraces of 6 roods in length, by 1¼ in breadth are found to be the most advantageous size for ensuring the best yield of grass. If the level of the beds be found after a few years' watering to be raised too much, the canals can each be carried a foot or two higher up the slope, the old cuttings being closed and covered with the turf taken out of the new ones.

"The sluice cuttings in the dam of the upper water-course are 5 inches wide, and their bottom is sloped, being at the upper end 6 inches higher than the level of the chief water-course. The irrigating canals are 5 inches broad and 4 inches deep. The transversal cuttings are of the same dimensions.

" *Irrigation by means of Narrow Ridges.*—In a meadow irrigated on the system of narrow ridges, the water-course, with the sluice cuttings through its dam, are the same as in the terraced meadows. The distributing canal is kept horizontal, and is 1½ feet broad and 5 inches deep. The meadow is measured and divided into equal portions, the best size for which is between 15 and 25 feet. Each bed or ridge is supposed to have a breadth of 20 feet, so that each slope has a breadth of 10 feet. The ridges are 60 feet in length. Stakes are driven at the openings of the transversal cuts, which are levelled, and the draining conduit must then be marked out, and stakes fixed at the points. The fall does not exceed 1 foot in a length of 63 feet. With the aid of the last stakes parallel cuttings are made in a transversal direction from the draining conduit in the direction of the distributing channel, but stopping at some distance short of the latter. The bottom of these cuttings is sloped, being 5 inches higher than the level of the draining conduit. The cuttings divide the ridges and serve as drains. Between them the ground is raised in the middle so as to slope towards each draining canal, the upper part of the ridge being kept high enough to carry an irrigating canal, which takes the water at the level of the distributing canal, and carries it with a slope of 5 inches to the draining canal. When this canal is full, and overflows, the water runs into the lower cutting, and thence into the lower drain, in the bottom of which there is also a slope of 6 inches.

" At the lower end of every ridge the surface presents the appearance of a triangle.

" *Irrigation with Broad Ridges.*—In a meadow laid down near Keppel with broad ridges, the water in the brook that supplies the main canal is scanty in summer, and is applied to turning the wheels of some steel-works. The main canal is 4 feet broad, 1½ feet deep, and has a fall at bottom of ¼ inch in soft. The dam is three feet broad, and the sluiced cuttings through it are each 1 foot broad. The horizontal distributing canal is 2 feet broad and ½ foot deep. The ridge-cuttings that issue from it are 90 feet long; at the mouth they are 1½ feet, and 1 foot broad, with a depth of 5 inches. The width of each ridge is 60 feet, consequently each bed or slope is 30 feet broad.

" In order to diminish the size of the intervals between the cuttings transversal canals are carried across the beds. The drain-cuttings have a fall at the surface of only 3 inches, but at bottom of 5 inches being 4 inches deep and 8 inches broad, and 6 inches deep and 1 foot broad. In this meadow the chief drain serves as a distributing canal for a meadow situated below and adjacent to it. In a meadow laid out by M. Vorländer in such a manner as to combine the terrace plan applied to the more elevated part, with the narrow ridge system, the drain canal serve as distributing canals for the meadows situated below them. In a large meadow near Keppel, by a skilful adoption of the various modes of laying down the surface, the same water is carried over eight different plots of land in succession.

" The proper time for cleaning out the ditches and canals is late in the autumn, when the cattle are no longer driven to the meadows. A day is fixed by the overseer of the meadows by which all the canals have to be cleaned out under a certain penalty. Then it is that the principal watering for the year takes place. If there has been heavy rain and the irrigating brooks are muddy, the water is not let on to the meadows until it begins to get clear. Too great a sediment fills up the canals and leaves unequal deposits on the surface that mar the labours of the meadow owner. In the autumn no fear is entertained of the meadows being over-watered. The great point sought to be accomplished is that the flow of the water shall everywhere be perceptible, and that none remains stagnant in any part. In the beginning of winter when the frost sets in, the water is kept off the land. If the weather is open and rain falls, the water may be turned on again.

"Spring is the season that demands the farmer's care. In mild rainy weather the irrigation may be continued; but after floods, as in the autumn, the water must be allowed to settle. When the sun grows powerful the irrigation must cease altogether. In March and April a little moistening is allowable; but in these and the following months the water may only be spread during the night. In the middle of June occasional night watering does good, but none is let on for four weeks previous to the hay harvest."

In reference to the general character of the farming on the lower Rhine, Mr. Banfield has these remarks:—

"From Cleves to Cologne in a straight line is about 70 miles: from Aix-la-Chapelle to Hagen in Westphalia, the base of the triangle we have measured, is nearly 100 miles. Our triangle is therefore equivalent to one leaning with its base upon London and Bath, and having its apex either at the extremity of the Isle of Wight, or in a northern direction at Coventry. Yet how different an appearance do the two English district here marked out present from the portion of Germany with which we would compare them! Good high roads and navigable rivers traverse the German as the English districts, and afford them the advantages of trade. The population is nearly equal in density, and in abundance of iron and cheapness for the general consumer there is no great disparity. To the most unpractised eye, however, it must be evident that in the English districts more wealth is acquired in the year than in the German. The crops are more abundant, the outlay of capital is repaid sooner, the prices of produce are all higher in England than on the Rhine. Let us go into the details of the comparison.

"It will hardly be disputed that the profit drawn from Agriculture, as well as from other branches of industry, is the more conspicuous the fewer the hands are that divide it. Now since farming, properly so called, is carried on in England upon allotments varying from 100 to 1000 acres, whereas the common limits in this part of Germany are from 10 to 300 acres, the difference in the numbers sharing the profits in both countries is at least as 1 to 8 or perhaps 10. We have no doubt that the number of estates exceeding 1000 acres, managed by one farmer in central England exceeds the number of those above 300 acres on the Rhine. In the districts more remote from the thoroughfares of trade, the proportion of the population employed in agriculture is overwhelming as compared with other occupations. Hence the low prices of produce in good years, and the difficulty the Germans find in accumulating capital. Where there is a superfluity of produce, if all produce the same, there can be no market. So it is in Germany. Every man grows his own bread. Who is to buy of those who produce more than they require for their own consumption? It is owing to this circumstance, and not because the cost of tillage is less, that prices are so low. To raise them it will be necessary to open new fields of labour in trade and manufactures, into which many of the present cultivators of the land must be induced to migrate, and thus to leave to a smaller number the division of the profits in agriculture. The gift to the peasants of the small lots they held, in the manner before described, had quite a contrary tendency, by keeping them on the land which they would by degrees have left. But at that time, and even still, the panacea prescribed in Germany for all widely spread discontent is to subdivide the land. Unless such a measure be accompanied by a multiplication of the consumers, that is to say, of the markets, it is not easy to see what agriculturists have to gain by such a step. In Prussia it is estimated that three persons are employed in agriculture for one engaged in trade and manufactures. This will explain why, with such low prices as we usually find quoted in Germany, there is never a superabundance of corn, while prices rise rapidly on the first symptom of a demand from England. It will also account for the modes of cultivation that prevail, under which only a moderate yield is extracted from the land. That with the soil and climate of the lower Rhine a far greater return might be obtained, is shown by the example of Belgium and England. But why should it be raised if there is no one to buy it? The exportation of wheat to France and Belgium assumes every year a more constant form. It will not be long before England appears as a regular customer at the Continental markets. It will then remain to be seen whether the more distant but more fertile districts of Poland will be able to furnish grain on better terms than the nearer plains of Germany with their intelligent population. The irregularity of our demand has obliged countries that cannot produce without cost to leave us out of their calculations.

"The next weighty consideration that presses itself upon us is the fact that, in the trading and manufacturing districts, and on the Rhine generally, both the rent of land and its capital value are higher than that of similarly circumstanced land in England. We have endeavoured to explain this fact from the circumstance that there are crops that at all times assert their full value in the market of the world, such as seeds, flax, tobacco, dairy produce, &c. On these the German farmer who works on a sufficiently large scale relies for his profit. It so happens that the demand for all those articles must increase when the price of corn falls, for more of them is consumed when bread is cheap than when it is dear. Thus the landlord holds the disease and its remedy in his own hands; if he wishes market crops, as they are here called, to rise in value, he must lower the price of grain. If corn became so cheap that it was not worth growing, he would find an immense demand for all other produce to indemnify him."—Banfield's Industry of the Rhine.

REPORT ON THE EXHIBITION OF IMPLEMENTS AT THE SHREWSBURY MEETING OF THE ROYAL AGRICULTURAL SOCIETY IN 1845.

BY JOSIAH PARKES, CONSULTING ENGINEER TO THE SOCIETY.

A fact of interest to notice in the record of this meeting is, that the exhibition of implements was equal to the very best which had preceded it. It was feared by many persons that the Shrewsbury meeting—isolated as that town is with respect to railway conveyance and communication, and lying so distant from the eastern and southern parts of England, where many implement-makers reside—might not attract so large an assemblage of mechanical exhibitors as to render the show subservient to the extended objects of the society, and correspondent to the wishes of its ardent friends. The writer, however, cannot call to mind the absence of a single known meritorious implement; whilst he speaks the sentiments of the oldest appointed judges, and of many constant visitors of the society's shows, in observing that no previous show-yard has been richer in inventions of promise; and that no one has contained a greater variety of well manufactured implements. The stands of the exhibitors were perhaps not stocked with such numbers of similar articles as on some other occasions; but this is a desideratum, not an evil. The exhibitors can gain little or nothing by the display of a number of implements of the same kind and make; these, indeed, serve only to encumber the ground, increase the area, and augment the cost of the show-yard, without contributing to its intrinsic value as an exhibition of practical mechanical science, adapted to agriculture, which is the object sought by the society.

It had been resolved by the council that, on this occasion, the judgment on ploughs, drills, and tile-machines should not be declared until a second trial of them had taken place at a later period of the year. These deferred trials were accordingly made on the 23rd and 24th of October, on the estate of Mr. Pusey, M.P., at Pusey, in Berkshire. They were conducted under the management of the stewards; all the judges and the respective exhibitors attending. The competing implements consisted of six ploughs, five drills, and three tile-machines, which had been selected by the judges from those put to trial at Shrewsbury; including also the plough and drill which had received the society's prizes in 1844, at the Southampton meeting. The tile-machine to which the prize of 1844 was awarded did not appear either in the show-yard or at Pusey, to compete with the machines of this year.

The private trials by the judges were conducted both in the field and in the enclosure attached to the show-yard at Shrewsbury, with satisfaction to themselves, and to the exhibitors. This arrangement was first essayed at Southampton, and its advantages, as stated in the report of that meeting, were fully confirmed at Shrewsbury. This mode of conducting implement-trials may now be considered as incorporated with the system of management to be pursued by the society at future shows. It was wisely planned, and has been successfully carried out; and with one day added to the term allotted to the judges for inspection and trial, it will rarely occur that any trial need be deferred to a later, or to any other, period of the year than that chosen by the society for its annual country meeting. Delay in giving judgment is alike injurious to the interests of the exhibitors and of the society, and it is at the express desire of all the judges that the writer declares their sentiments to the council in this report.

Ploughs.—A large number of ploughs were set to work at Shrewsbury on the splendid pieces of land assigned for the trial-grounds by Mr. Isaac Taylor, of Monkmoor. The soil was in admirable temper for the occasion, and the judges had little difficulty in selecting the implements which they deemed most worthy of being submitted to the final trial subsequently made at Pusey. These consisted of

Swing ploughs—By David Harkes, of Mere, near Knutsford: by William Wood, of Knutsford.

Two-wheel ploughs—By Messrs. Howard and Co., of Bedford; by Messrs. Mapplebeck and Lowe, of Birmingham (manufactured by Messrs. Ransome); by Messrs. Sanders, Williams, and Taylor, of Bedford; by Edward Hammond Bentall, of Heybridge, near Maldon, Essex.

The light land at Pusey was precisely of the quality answering to that designation, and after a series of trials of all the ploughs, three of them were culled for the finishing combat. These were respectively made by Messrs Howard and Co., Messrs. Sanders, Williams, and Taylor, and Messrs. Ransome; and it is worthy of remark that the implements of these three manufacturers had before frequently come into close competition at the Society's shows with varying success. These three excellent ploughs, each being held by the maker's own chosen ploughman, were finally set to work by the stewards, in the judges' absence, to complete a land each. Their performance was then inspected by the judges, and the prize for the light-land plough was awarded to Messrs. Howard and Co. The dynamometers of Mr. Clyburn and of Mr. Bentall were applied, and it appeared from both of them that Messrs. Howard's implement took the least draught, as well as made the best work—a result quite consistent with the experiments previously made at the Society's trials. The judges considered the second-best work to have been done by Messrs. Sanders, Williams, and Taylor; their remark on Messrs. Ransome's performance being that their ploughman was considered to have taken too wide a slice for the depth, which gave his work a less perfect and a less satisfactory finish.

The six ploughs, with Messrs. Ransome's prize-plough of last year, were then transferred to a piece of land on Mr. Pusey's farm at Longworth, consisting of strong *Oxford* clay—a clay of that tenacious, unmixed, and decidedly "*honest*" nature, which also characterises (though belonging to another geological stratum) the Wealds of Kent and Sussex. In this field was working the antiquated wooden Berkshire plough, with its high wheels and gallowses, drawn cleverly by three strong oxen. On putting the selected iron ploughs into this soil, the swings were quickly doomed as incapable of work. The wheel-ploughs struggled for a while with four horses to each, but no one of them succeeded in turning a satisfactory furrow 7 inches in depth; they laboured, indeed, on the points of their shares only, their hinder parts being nearly level with the top of the furrow-slice, and the team of four being evidently distressed. Though the land had been underdrained at 20 feet apart, and 34 inches in depth, ploughing it with two horses, with any plough, would evidently be impracticable. The judges were of opinion that Messrs. Ransome's prize-plough of last year performed somewhat better than the others, but that none of them were fitted to cope with this peculiarly heavy land. The Society's prize "for the plough best adapted for heavy land" was therefore withheld, on the ground of insufficient merit.

It has been suggested in former reports that one cast of plough and one form of mould-board and share cannot be equally correct and suitable for all soils; and a useful moral may be drawn by the mechanic from the result of the trials at Pusey, viz., that all that is ancient in agriculture is not, therefore, to be despised: and that there may be very sufficient cause for the dogged preference given by the Berkshire, Kent, and Sussex clay-farmers to their old accustomed implements. It is the business of the plough-wright to discover wherein lies the secret of this excellence, and to apply it, if he can, to the composition of a less cumbersome, more sightly, and still more efficient machine.

One-Way, or turn-wrest ploughs.—After trial in competition with other ploughs of this kind produced by Mr. Comins, Mr. Read, and others, the society's prize of £5 was awarded to Mr. Henry Lowcock, of Westerland, Marldon, Devon. This plough, which received a premium at Southampton, was found improved on the present occasion, being less tickle, and more comfortable in the handling; but the judges entertain the opinion that it is more suitable to hilly than flat districts. It is described fully in the last report.

Skim or Paring ploughs.—The society's prize for this class of implement was accorded to Mr. John Bruce, of Tiddington, near Stratford on Avon, who also received a premium from the judges at Southampton on its first introduction, and an account of which appeared in that report. Extended experience of its use has fully justified the good opinion then given of it.

Subsoil Pulverizers.—Nine subsoil pulverizers were tested by the judges, and their merits carefully examined; the result of the trial being that the society's prize was adjudged to that produced by Mr. John Read, of 35, Regent Circus, Piccadilly, London; thereby confirming the judgment of the previous year. The writer refers to the Southampton report for a full description of the nature and action of this simple implement, its efficiency having been proved by most extensive practice. The one tried at Shrewsbury was entirely composed of iron, the beam being formed of a double flitch of light but very strong hollow iron, the invention of Benjamin Stratton of Bristol, which renders the implement particularly well adapted for use in tropical climates, where it is already advantageously known.

Clod-Crushers. — Mr. Crosskill's well-known crusher and roller again proved itself to be superior to all competitors, and received the Society's prize. It was tried against one produced by Mr. Garrett and another by Mr. Cambridge. The judges observe that by reason of every rolling rim being separate and all revolving on a round axle, Mr. Crosskill's implement possessed decided advanages over Mr. Garrett's; whilst Mr. Cambridge's, might be considered as a fair roller, but was not entitled to bear the name of a clod crusher.

Scarifiers.—Eleven of these important impleplements were put to work, the Earl of Ducie's Uley cultivator obtaining the judges' preference, who once more awarded to it the Society's offered prize. The judges deemed the variety of work to which this scarifier is adapted to be one of its greatest advantages, and particularly notice the precision with which it acts as a skim or paring-plough. They consider it, however, questionable whether it may not yet be improved by adapting a method of more instantaneously raising the tines out of the ground.

A scarifier was produced by Mr. Evan Thomas, of Keel Meiford, near Welchpool, which possessed a novel, simple, and powerful leverage, and quickly adjustable; for which leverage the judges awarded a premium of 2*l.* This scarifier acted well both in the ground and as a skim; but its length was thought to be much too great, and therefore that it was not well fitted to work ridged lands.

Harrows.—Of the iron harrows produced by Messrs. Sanders, Williams, and Taylor, of Bedford, it suffices to say that no farmer would use wooden ones if he saw these work. The Society's prize was again awarded for them, as unquestionably the best in the show-yard.

A harrow of an entirely novel construction and of great promise, in the estimation of the judges, was exhibited by Mr. George Edward Frere, F.R.S., of Edinburgh, and attracted much attention in the field. It is called the Norwegian harrow or clod-crusher, and was originally imported from Norway by Mr. Frere; the one under notice having been constructed, with some changes, by Mr. Richard Stratton, of Bristol. The acting part of this implement consists of a frame containing four horizontal spindles, on each of which is fixed a set of cast-iron bosses, with teeth projecting from them like the rowels of a spur. These teeth revolve with the spindles, those on one spindle inter-working with the others, so that they severally clear and clean each other. The effect produced is a remarkable bruising, crumbling, or disintegration of the soil, without any clogging of the spikes, or possible derangement of the working parts. The weight suffices to cause the spikes to penetrate to the required depth, which is also governed by an adjustment of the wheels applied for travelling the implement, and for taking it out of work when turning—but it acted quite as well when divested of the wheels and of other paraphernalia, which tended rather to embarrass than its good action. Neither stones nor sods appear in any way to obstruct the working of this eminently simple machine, the stones being pushed aside, and the sods torn to pieces. The force was thought to be less than that required to work a common set of harrows going equal depth, and the effect in pulverization much greater. It was tried on two different kinds of soil immediately after ploughing with similarly good results. To what extent this implement may act as a clod-crusher the judges cannot say, as they had no means of trying it—but this distinction may be drawn between it and such an implement as Mr. Crosskill's, viz., that the Norwegian harrow leaves the land perfectly light and loose, whilst the clod-crushing roller gives to it firmness and consistence.

The judges awarded to Mr. Frere a premium of 10*l.*, and Mr. Stratton obtained many useful hints from this first trial of the implement for its future improvement.

Drills.—A variety of drills having been tried at Shrewsbury, a selection was made of those which seemed most likely to realise the conditions attached to the respective prizes offered by the society.

These were transferred to Pusey, and there put to the final test. They consisted of—

A corn and manure drill for general purposes, by Mr. Hornsby, of Grantham.

A corn and manure drill for general purposes, by Mr. Garrett, of Leiston (being the drill which obtained the prize at Southampton).

A turnip and manure drill for flat work, by Mr. Hornsby.

A turnip and manure drill for ridge work, by Mr. Hornsby.

A turnip and manure drill for ridge work, by Mr. Garrett.

A turnip and manure drill for ridge or flat work, by Mr. James Smyth, of Peasenhall.

These were severally and carefully worked both with dry and moist manures, and the society's prize for each class of drill was adjudged to Mr. Hornsby, the judges' opinion being that his drills were more open and simple, and more completely accomplished the desired purposes than those produced by any other exhibitor.

The drill may now be esteemed to be capable of putting into the ground with certainty and despatch a much greater quantity of manure than can be required for any given crop, and of well covering it before the seed is deposited; but, though surpassing in power of delivery the amount of manure which a good farmer may at any time have occasion to employ, it will be understood that the apparatus of the manure-box is adjustable to the discharge of the smallest desired quantity, and of whatever nature the manure may be. The same means also which have gradually been adopted by drill-makers to secure the delivery of an extreme quantity of rough and damp manures, prevent the necessity of so carefully screening out stones as was requisite previously to the improved forms of boxes and stirrers. There are points in drills, however, which the judges still regard as short of perfection, and to which they desire to call the attention of their constructors, viz., the form of rollers best adapted for turnip ridge-work on soils of different texture, and the arrangement of the self-acting lateral motion given both to the rollers and coulters.

A premium of 10*l.* was awarded to Mr. William Edward Vingoe, of Penzance, Cornwall, for an implement entered as a seed depositing, or planting machine, but which may be properly treated under the class of drills. This implement, then a recent invention, was first brought to the notice of the society at Southampton, reappearing at Shrewsbury with several important additions and improvements. It there enlisted the judges' earnest attention, and received their unqualified admiration from the simplicity of its acting parts, the accuracy of its deposition of seed, and the mechanically good adaptation of means to ends. Although simple, it is difficult to describe. It travels on three wheels, the leading pair being attached to the shafts, from which pair is derived the small power required to effect the measurement and deposition of the seed. The machine exhibited was capable of sowing six rows of corn or other seed at a time. The apparatus for forming the drills consists of six pressing-wheels, immediately followed by as many narrow hollow boxes or shares, which maintain the little trenches clean and open, and each trench perfectly distinct, until the seed falls into them. Through these shares the seed is conducted by small tubes from the seed-box or hopper, above them; and immediately behind the shares is placed a peculiarly simple and effective kind of hoe for covering the seed. The seed is received upon sliders resting on the bottom of the hopper, and furnished with proper recipient holes, the size of which determines the number of seeds desired to be planted. Means are provided for striking off excess, and it was found, on repeated trials, that no greater difference took place in the number of seeds deposited than was fairly attributable to the difference in magnitude of the corns. The entire apparatus is readily raised out of the ground at headlands, or when turning.

This machine is especially recommended by the judges to the notice of those agriculturists who have the means and wish to assist in developing and proving the merits of new inventions. If the preparation of a firm seed-bed be a good principle, this machine effects it as well as any presser—pressing and drilling six rows at once, with an adjustment for shifting the widths of the rows from 5 to any other number of inches apart desirable for grain; and it either distributes the seed in a train, or drops it within a small compass.

Drill Pressers.—After a minute inspection and trial of several pressers the society's prize was bestowed on Mr. Hornsby, of Grantham, for his two-row drill-presser. Some good practical improvements in the manure apparatus of this implement have been made since it commanded the preference at Southampton (*see* last report). In the event of a stoppage in the descent of the manure the attendant had, previously, to mount the box and push the manure down with a stick. This defect is now remedied by means of a moveable breast-board applied to the box, having a long iron handle attached to it, which enables the attendant to pull down the manure when necessary direct upon the coulters, so that he has no need to quit his place at the hind part of the drill.

Dibbling Machines.—The prize offered for the best horse seed-dibbler was awarded to Mr. Newberry for his ingenious and now well-known machine. Its great weight is found fault with by some, but that is precisely the quality sought for and approved by other farmers in an implement of this kind. Its greatest present defect is not a mechanical, but, nevertheless, a real one, viz., its price; and if it were possible to diminish that, it is probable that many criticisms on the completeness of its performance would vanish. The judges made experiments on the droppings of a five-row and single-row dibbler, which are subjoined:—

Number of corns of wheat dropped by the five-row machine:—

	3	5	6	4	2
	5	3	6	7	5
	7	3	5	1	3
	4	5	8	3	5
	0	3	1	5	2
	3	5	4	2	4
	3	3	5	4	7
	3	3	5	4	2
	3	5	1	5	4
	4	3	5	5	4
10 droppings—	35	38	46	40	38

Ten droppings of the single-row machine charged with beans, tried three times over, gave respectively 25, 39, 28; the number dropped at any one time varying from 1 to 6.

The accuracy of this important function of the machine was certainly not so satisfactory to the judges as they could desire; but they had cause to believe that it arose, in a degree, from the haste with which the machines had been finished. They also remark that they think the steerage may be improved.

The prize offered for "the best hand seed-dibbler" was withheld. There was no competitor with Mr. Smith, of Droitwich, whose implement was fully described in the Southampton report, and tried on this occasion; but though improved and much commended, the judges did not consider its performance to warrant their bestowing the prize upon it. Its defect lies in its inability to get through a sufficiency of work, not in the apparatus, which is correct and particularly suitable for gardeners' use.

A silver medal was awarded to Mr. Bentall, of Heybridge, Essex, for a seed-dropping instrument, which was considered to be well worthy of extended practical trial.

The following statement given to the writer by one of the judges at Shrewsbury (Mr. Burness, Park Farm, Woburn), may serve to assist the mechanic in his estimate of what the farmer requires as to speed and cost in dibbling:—"I have this year employed boys, and dibbled 100 acres, the cost amounting to something less than 3s. per acre. The holes are made 3 inches asunder in the row, the distance between the rows being 9 inches, and the number of dibs per acre amounting to 232,320. The boys earn 3s. per week. I have boys who will for a short time, make 151 holes per minute, but, of course, they cannot long continue at such a rate."

Chaff-cutters.—The number of chaff-cutters exhibited was beyond all precedent. The judges selected twelve machines from different manufactories the same man provided by the stewards being employed to turn all of them, and the owner himself, or his man, feeding. The rule of length to be cut was half an inch, the substance straw, from the same heap; and the judges report the condition of length to have been so nearly alike that the results could not, in any material degree, have been affected by its variation.

The time given for estimating the quantity cut by each machine was three minutes, after getting into work—the turning man exerting himself to the utmost on each occasion, under the eyes of the judges and stewards. The chaff was measured in a standard bushel. The following were the results, arranged in the order in which the machines came indiscriminate to trial.

Price.			Work done.	Exhibitors' Names.
£	s.	d.	Bushels.	
13	0	0	3½	Messrs. H. Smith and Co., Stamford.
7	0	0	4½	Messrs. Sanders, Williams, and Taylor, Bedford.
8	10	0	4¼	Mr. James Richmond, Salford.
14	0	0	4 and a fraction	Earl of Ducie, Totworth Court.
8	8	0		Mr. Richard Garrett, Leiston.
8	8	0	3¼	Messrs. Barrett, Exall, and Andrews, Reading.
8	8	0	4½	Messrs. Colbourne and Ward, Stratford-on-Avon.
11	0	0		Lieutenant Vibart, Chilleswood, near Taunton.
8	8	0	4½ and a fraction	Mrs. Mary Cartmell, Liverpool.
8	8	0	3	Mr. Gillett, of Brailes, near Shipston-on Stour, Guillotine engine, by Messrs. Ward and Colbourne.
7	0	0		Mr. S. Beardmore, Leek.
10	0	0	6½	Mr. Cornes, Barbridge, near Nantwich.
10	0	0	5¼	Mr. James Spencer, Hopton, near Worksworth.

Note.—The machines to which quantities are not assigned were considered as producing too insignificant a result to be worth measuring or recording.

After this thorough riddling, there could be no hesitation in the minds of discerning men to whom the prize offered by the society should be awarded, and it was accordingly given to Mr. Cornes; and never was a prize more fairly won, nor more correctly bestowed. In addition to this due regard to quantity of work done, and power employed, the judges put Mr. Cornes's implemen to the severest tests in respect of its liability to foul or choke, and it appeared that in whatever manner the straw was crammed into it, whether straight, or however knotted and entangled, the result was equally good as regards clearance. Smaller machines than the one submitted to this trial, and at less cost, are constructed by the same maker on similar principles.

A premium of £5 was awarded to Mr. Spencer, of Hopton, for his very admirable chaff-cutter, which, though not equalling the foregoing in capability of work, is so excellent a machine, so well made, and so well adapted to *real business*—like all implements of his construction—that the judges unanimously resolved to confer upon it this stamp of merit and recommendation.

Linseed Crushers.—This was the first occasion on which the society had offered a distinct prize for the best machine to crush linseed. It was awarded to Mr. Dean, of Birmingham, after comparing the quality and quantity of work done by many other crushers in the yard. His machine bruised well 5 pecks per hour, and can be safely recommended as in every respect fitted for farm service; it also bruised barley with linseed better than any of the other machines.

The Earl of Ducie's oat and bean crusher, on the

V principle, formerly prized and noticed, stands yet pre-eminent, in the opinion of the judges, for work of that kind, but was thought not to be fully equal to Mr. Dean's, when crushing linseed alone, or linseed with barley. Mr. Cartwright of Shrewsbury, Mr. Richmond of Salford, and Mr. Spencer of Hopton, severally produced oat and bean crushers deserving high commendation and confidence.

Steaming Apparatus.—Four sets of steamers for roots, &c., were carefully tried, and their merits examined, the Society's prize being awarded to Mr. Richmond of Salford, for his very neat and compactly arranged furnace, boiler, and steaming-vessel; Mr. Richmond undertaking to render the water-feed self acting; without which provision, and that made quite efficient, no steamer can be considered to be safe against explosion.

Weighing-machines.—A multitude of implements denominated by the exhibitors *weighing machines*, appeared to contest for the society's prize; but by far the greater number proved, on testing them, to be unworthy the appellation. This prize was adjudged to Mr. James, of London, whose machine is, as has been observed in former reports, perfectly correct in principle, and practically good. The judges, however, still consider that a greater degree of portability is desirable than has yet been accomplished by Mr. James, or other makers, in order to realize all that is wished for by the society and farmers generally.

The judges awarded a premium of £2 to Mrs. Mary Cartmell, of Liverpool, for a simple, cheap, and true machine for weighing sacks and light objects, which is worthy of confidence, and deserves commendation.

Churns.—Mr. Richmond, of Salford, received the Society's prize for a very effective upright, double-piston churn, which has the further recommendation of being easily worked.

Drain-tiles or Pipe-machines.—Eleven different makers competed at Shrewsbury in this class, exhibiting 14 machines of various contrivance. The business of the judges being to select those for subsequent trial which they might deem to possess the greatest merit, each machine underwent the necessary examination and tests, with clay furnished by the stewards, and many of them with clay as prepared by the exhibitor. The selection fell on machines respectively made and exhibited by Mr. Clayton, of London; Mr. Beart, of Godmanchester; and Mr. Scragg, of Calveley, Cheshire. The final trial of these was made at Pusey, and the society's prize then adjudged to Mr. Scragg.

There is so great an interest and importance attached at the present time to machinery for preparing the materials of drainage, that little less than a volume would suffice to satisfy the public appetite for knowledge on the subject. But neither treatise nor manual can make a pipe or tile manufacturer; nor can this report be extended beyond an explanation of the principal reasons which guided the judges, appointed by the society, in the application of the prizes placed at their disposal; with the mention of such matter as may be incidental to the particular subject.

Mr. Beart's machine was found to be inferior to both the others—first, in the faculty of freeing the clay from stones; secondly, in the quantity of work done in a given time.

Both Mr. Clayton's and Mr. Scragg's are excellent machines, and they are both practically adapted for the service of the tile-yard. They are, however, constructed on entirely different plans. Mr. Clayton's is a perpendicular and fixed, Mr. Scragg's a horizontal and locomotive, machine. The judges preferred the latter principle, as more convenient as economising labour, and as saving valuable space in the management of the goods in the drying-shed. The method of cutting off the pipes or tiles to determinate lengths is imperfect in Mr. Clayton's; it is mathematically correct in Mr. Scragg's machine, and this is a matter of no slight importance in stacking the pipes or tiles in the kiln. The screening, or freeing the clay from stones, roots, or other extraneous matter, is performed with less labour by Mr. Scragg than by Mr. Clayton; but the judges think it possible that cases may occur in which Mr. Clayton's perforated screen may prove to be superior to Mr. Scragg's barred screen, as exhibited at Shrewsbury.

The cost of Mr. Scragg's machine is considerably less than Mr. Clayton's, the dies included; and Mr. Scragg's dies are made on a principle which is considered to be far superior, in the important points of accuracy and simplicity, to those of any other maker of pipe-machines.

Finally, Mr. Scragg's machine was proved to produce a greater number of articles in a given time than Mr. Clayton's, and the latter than Mr. Beart's.

The judges have thought it right to adduce the foregoing close contrast between the merits of Mr. Clayton's and Mr. Scragg's machines, because they considered both of them to possess qualifications of a high order, and far superior to those of any other machines exhibited; and because the reputation of Mr. Clayton's machine has been well merited, and notoriously well established. They do not think they would be doing their duty to the society without reporting, thus succinctly, the motives of their judgment.

Mr. Scragg's machine is equally well adapted to the manufacture of the horse-shoe tiles as of pipes, and of most other descriptions and forms of articles commonly manufactured in tileries, or required in drainage. The writer has one of them in use, made since the show at Shrewsbury, which produces nearly double the quantity of the machine shown there. It is equivalent to the easy manufacture of more than 20,000 pipes, of an inch bore, per day of 10 hours, and so on in proportion for other sizes; it is also worked at a less cost of labour, and with greater ease to the workmen, than any other machine with which he is acquainted.

This machine is new to the society, but not so in reality, as a model of it was shown to the writer immediately after the Derby show by Mr. Davenport, of Capasthorne, Cheshire (Mr. Scragg's employer), who also informed him that it was at work on his own premises, as then constructed with two distinct dies for making horse shoe tiles. This was set to work in August, 1842, and was, as the writer thought till very recently, the earliest invented machine for producing more than one stream of ware of any kind at a time, It seems, however, that all these inventions—and particularly those for the manufacture of pipes—were long since anticipated by a machine in use at the pottery of Mr. John Watts, of Coleford, Gloucestershire. This gentleman informs the writer that his father purchased a machine for making pipes, and the exclusive right of using it, forty-four years ago, of a man named Richard Glover, living near Ludlow, in Shropshire. It has been in use, with some improvements, at these works ever since, and fully exposed to public view. It is a screw press, making 3 pipes at once of 3 inches bore, 4 pipes of 2 inches bore, and 6 pipes of 1½ inch bore, of about 28 inches in length each. This date carries us farther back than Mr. Read's invention of pipes in Kent by hand; but it is proper to observe that Mr. Watts's machine has been only employed to manufacture pipes for the conveyance of water for domestic purposes, &c.; and that Mr. Read still retains the presumptive right to be considered the earliest manufacturer and applier of pipes to land-drainage.

Until the appearance of Mr. Scragg's machine, which is now making for the writer 11 pipes, of 1 inch bore, at a time, the meed of precedence in respect of number of articles produced at once, as well as of originality in the invention of pipe machinery, must be accorded to Richard Glover, the inventor of Mr. Watts's machine; and the birth of this invention must have been, by many years, anterior to that of the little single pipe-machine used in Kent and other southern counties, the latter being consequent to the successful use of pipes by Mr. Read,

Moveable Sheep Fold.—The prize offered by the Society for this article was awarded by the judges to Mr. Edward Hill, of Brierly Hill Iron-works, near Dudley; but it was subsequently withdrawn by an order of the Council at Shrewsbury, in consequence of Mr. Hill's refusal to sell the implement at the price declared by him in the catalogue, he thereby infringing a rule of the society.

The fold, however, was of a construction which elicited much approbation, being moveable on wheels furnished with cribs, and admitting of a lot of sheep to be covered whilst feeding, with a run out in an enclosed space at will.

MISCELLANEOUS :—

Carts :—The only carts in the stands of the various exhibitors which were thought to possess superior and novel merit were two; the one invented and manufactured by Mr. Clyburn, at Earl Ducie's works; the other by Mr. Crosskill, of Beverley.

The first is called a "Richmond cart," which received a medal at Southampton, in consequence of its having an easy method of adjusting the load on descending hills, and its generally good and durable fittings. It was, on this occasion, so arranged as to receive a wrought-iron tank for liquid manure, made to fit into the chest or body, the shipping and unshipping of which was perfectly manageable by one person. This combination appeared to the judges to be one of those practical and useful arrangements which would be suitable to many farmers, and they therefore awarded to Mr. Clyburn a premium of £5.

Mr. Crosskill's is a thoroughly well made and cheap one-horse cart, having a particularly simple and safe tipping contrivance. The especial reason for awarding to it a premium of 2*l.* was the introduction of a self-acting tail-board, which opens and shuts as the body is tipped, or brought home, so that no time is lost by having to unship and ship a tail-board, whether the contents of the cart have to be discharged at once or at intervals.

Horse-hoes.—Mr. Garrett's often prized and excellent implement for hoeing after drilled corn and seeds had no competitors. The judges gave a premium of 2*l.* to Mr. Harkes for his parallel expanding turnip-hoe, formerly prized and noticed, and which was rendered still more steady and effective by the application of coulters before the shares. This may be considered to be the most perfect turnip-hoe extant, price 3*l.* 10*s.* But there was another turnip horse-hoe produced by Mr. Dickon, of Caistor, price 1*l.* 10*s.*, which was so good and so suitable for small farmers that the judges thought fit to award a silver medal to Mr. Dickon.

Cake Crushers.—The show-yard contained, as usual, a large assortment of these useful implements; and, after a careful trial of them, the judges again considered Mr. Hornsby, of Grantham, have produced the best machine of the kind, accordingly awarded him a premium 3*l.*

Turnip Cutters.—Mr. Gardner, of Banbury, has at length met with formidable rivals in Messrs. C. Phillips and Co., of Bristol, whose machine, on this occasion, was considered to excel that of Mr. Gardner, and to whom a premium of 5*l.* was adjudged.

Haymaking or Tedding Machine.—The show-yard contained only two of these machines, and, after trial, a premium of 3*l.* was again awarded to Messrs. Wedlake and Thompson for their well-known and very excellent implement.

Threshing Machines.—Several threshing machines were set to work, but the judges are compelled to report the whole of those tried to be much below par, and unfit for good barn service. It will be wise for exhibitors to look to the condition of these machines before bringing them to future meetings, as they will doubtless be subjected to still more rigorous tests than on this occasion.

The only machine to which the judges deem it necessary to advert as possessing merit or novelty, in this class, is the one produced by Earl Ducie, the invention of Messrs. Parsons and Clyburn. It threshes, cleans, and finally sacks the grain. It was driven by Mr. Dean's steam-engine, and so far gave satisfaction to the judges that they awarded for it a premium of 10*l.* It is a powerful machine; and although, possibly, adapted to the very large rather than to the moderate-sized farm, it was considered to merit high commendation and encouragement.

Winnowing Machines.—It will have been observed from previous reports, and more particularly from that of 1844, that the judges were dissatisfied with the state of invention in respect of winnowing or corn-cleaning machines. Much attention was given to those produced this year, and three machines came particularly to the test of trial. Of these, which were severally exhibited by Mr. Hornsby, of Grantham; Mr. Cooch, of Harleston; and Mr. Sanday, of Holme Pierrepoint, Nottingham; the judges have no hesitation in declaring the last-named to be decidedly the best. They report it as producing a better and cleaner sample of grain when passed once through it from the rough, than most machines can effect after three or even four operations; the sample being much superior to that generally shown in markets. They, consequently, decided in favour of Mr. Sanday, and stamped their opinion of the merit of his implement by awarding for it a premium of 10*l.*

Potato Washer.—A medal was given to Mr. Richmond, of Salford, for his very simple and effective potato and general vegetable washer. This little machine requires only to be known to be universally approved.

Granary Crane, Field Gates, Hurdles, Cribs, &c.—Two premiums were awarded in this extensive department, and both to Mr. Hill, of Brierly Hill Iron-works, near Dudley. A medal was bestowed for his general good assortment and construction of iron sheep and cattle hurdles, pens, racks, &c., and 2*l.* for a granary, barn, or store-room, crane and winch, well fitted, and furnished with a jib for turning the goods in or out of the building. Mr. Hill supplies this useful article, with 30 feet of chain included, for the price of 6*l.*, deliverable 100 miles distant from his works on any railway.

Garden and Fire-Engines.—Mr. John Read, of 35, Regent Circus, Piccadilly, continues without a rival in this department, and the judges awarded to him a premium of 5*l.* for his excellent inventions, of which full mention is made in former reports.

Hand Lever Power.—An award of 5*l.* was made to Lieutenant James Vibart for a newly arranged hand-engine or power applicable as the prime mover of chaff-cutters, threshing, or other machines. An advantage did appear to the judges on trial, and to the writer, to be gained by this engine, and to arise chiefly out of the great weight of the fly-wheel running very lightly on friction-rollers. The momentum of such a fly-wheel serves to store up, regulate, and equalize the force of the man or men when applied to give motion to machinery like chaff-cutters, threshing-machines, and the like; the resistance of which is perpetually varying. In giving this premium the judges desire it to be distinctly understood that it applies to the powers only, and not to the machines moved by it, as neither the threshing-machine nor the chaff-cutter produced by the same exhibitor, and tried with it, were considered to possess merit.

Steam-Engines.—Two steam-engines were exhibited and tried, both of which gave much more satisfaction than those which appeared at Southampton. The one produced by Mr. Dean, of Birmingham, nominally of four-horse power, was certainly equivalent to the effective delivery of a much higher power than that cited by the maker, and when using a safe pressure of steam. The arrangement of the boiler for generating steam quickly, and arresting the passage of sparks, also appeared to the writer efficient and suitable for farm use. The engine, mounted on four wheels, was finished in a workmanlike manner, and obtained from the judges a well-deserved premium of 10*l.*

Mr. Cambridge's engine was improved since its previous exhibition, and though not equal in point of power to the forgoing, it was deemed worthy of encouragement, and received an award of 5*l.*

Harness.—The makers of agricultural harness and gear do not appear to have felt that necessity for its improvement which has often been indicated as an object of importance by the Council. The only article worthy of note in the exhibition was a saddle with a moveable pannel, and a bit for bridles by Mr. Thomas Taylor, of Banbury, which were much commended by several of the judges.

JOSIAH PARKES.

—Journal of the Royal Agricultural Society.

TRING AGRICULTURAL ASSOCIATION.

LECTURE ON THE CHEMICAL COMPOSITION AND NATURE OF MANURES.

BY J. C. NESBIT, F.G.S., M.C.S.L., &C., OF THE AGRICULTURAL AND SCIENTIFIC SCHOOL, KENNINGTON, LONDON.

On Monday, 27th April, a General Meeting of the Members of the Tring Agricultural Association was held at the Harcourt Arms, adjoining the Tring Station, for the purpose of auditing the accounts for the past year, and arranging the premiums to be offered for competition at the ensuing annual meeting.

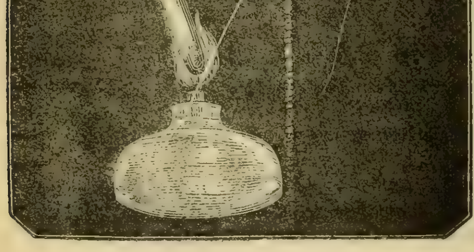
After this business the members sat down to an excellent dinner. J. A. Gordon, Esq., the President of the Society, took the chair on the occasion.

In the evening Mr. J. C. Nesbit delivered a highly interesting lecture to the Society, "On the Chemical Composition and Nature of Manures." The cloth having been drawn, and Mr. Nesbit having arranged his apparatus, he proceeded as follows :—

Gentlemen: I have great pleasure in appearing before you this evening for the purpose of attempting to explain to you, as far as this can be done in one lecture, a few of the facts and most interesting portions of chemistry which relate to the science of agriculture. Upon a subject of so much importance, and of so widely extended a nature, it is not to be expected that I can, in a single lecture, do more than take a cursory view of the matter; but I will endeavour to seize upon the most prominent parts of my subject now, and perhaps on some future occasion I may have the honour of entering upon more minute and extended explanations. Chemistry is a science which teaches us how to detect different kinds of matter: all matter has certain common properties, such as weight, extension, &c. But, for all that, there are different kinds of matter. You know that iron differs from gold, gold from silver, and so on: all these are elementary kinds of matter. Now, chemists have discovered about sixty bodies which differ totally and wholly from each other, which have properties quite distinct, and can easily be detected; and which can, if necessary, be separated, and handed round to be looked at. But, although there are as many as sixty of these different bodies, and some of them are very scarce, and only to be found in certain localities, and others are very plentiful, and to be found almost everywhere, there are not more than twelve or fourteen with which the farmer has anything to do, or which need to be considered in reference to the science and practice of agriculture. Out of the whole earth, I say that there are not more than twelve or fourteen chemical bodies with which the farmer has to do. Now the farmer soon knows the differences and distinction between any twelve or fourteen cows or bullocks, and I don't see any reason why he should not so readily comprehend and know the nature of those chemical bodies and their separate characteristics as he does those of cows or bullocks *(Hear, hear)*. These twelve or fourteen chemical bodies go to make up all that is grown upon the farm, whether it be wheat, oats, barley, mangold-wurtzel, turnips, or whatever else it may be. Some of them are derived from the land, and others are obtained from the atmosphere; and you will, perhaps, be surprised to hear that by far the greater portion is derived from the latter. Of all the substances which you cultivate on your farms, about nine-tenths are derived from the air; and only one-tenth, or in some cases one-twentieth, from the land. Now, I shall be able to prove this perfectly to your satisfaction. The matters in the air from which these organic substances are derived are, oxygen, hydrogen, nitrogen, and carbon, or charcoal. These may appear to some of you hard and stubborn names; but by frequent repetition, and a little more familiarity with them, you will find that they are just as easy to be understood as the words plough, harrow, or the name of any other farming implement. The first of these of which I shall treat is oxygen, which is a very singular kind of body, and possesses a very powerful attraction for all the other elements. It is this which rusts iron when left out in the open air: the rust which you see under these circumstances is nothing but the result of the action of oxygen upon that metal; and when you melt lead you find it covered with what appears to be a kind of dross, which is nothing more than the result of the action of oxygen on the surface of the hot metal. It is, indeed, one of the most powerfully acting bodies with which we are acquainted. One-fifth part of the air we breathe is composed of oxygen; in every five bushels of air there is one of oxygen. Water likewise contains a great quantity of oxygen; for instance, in every nine tons of water you have eight tons of oxygen. All the earths—clay, sand, lime, and marl—contain from one-third to one-half of this oxygen. This very powerful substance exists in the air as a gas, in water as a liquid in combination with hydrogen, and in earth as a solid. From the generality of earths it is not separated; from water it is; and from the air also. Now, I will endeavour to prepare a little of this oxygen: it can be prepared in various ways. I will take a substance called chlorate of potash—a compound of potassium, chlorine, and oxygen. This mixture when heated will give out its oxygen, and I shall then be able to test its presence. It has a very powerful affinity for all combustible bodies. It is this that allows the candles before me to burn; deprive them of it, and they would at once be extinguished. The light is produced by the union of the oxygen of the air and the tallow, or wax, upon the hot wick. Deprive the air of its oxygen, and you will have no light, no heat. Now, I shall heat this chlorate of potash in this tube; and when it has undergone fusion at a "red heat" an effervescence will take place, and oxygen will be given off. Now, this oxygen is that which consumes all your vegetables; it consumes the coal in the fire, and the coke under the steam-boiler; and when you make a mixen with straw, dung, &c., in your farm-yards it is this very gas which causes it to diminish in bulk, and the combinations to fly off to help to produce vegetables all over the world;—as well in the wilds and deserts of Arabia as in your own neighbourhood, or any other part of England. The gas is now given off from the chlorate of potash in the tube. I will ignite a small splint of wood, blow out the flame, and introduce the red-hot end into the tube. You see the flame is immediately rekindled. (Experiment repeated several times.) The increased power of combustion arises from there being pure oxygen ready to unite with the combustible body. If I drop the splint of wood into the tube, the combustion will be most intense, in consequence of the ease with which the oxygen of the chlorate of potash can then attack the wood. You now see how vivid is the light, and the wood is all consumed.

Fig. 1 represents the method of performing this experiment, and the effect produced.

Fig. 1.

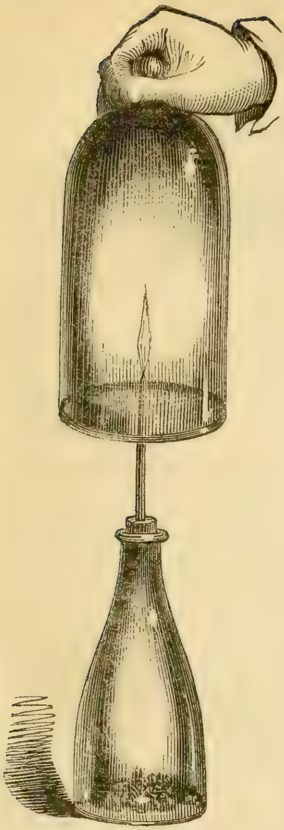


I shall next speak of hydrogen, which is contained in water and in all vegetable and animal matter. Water is composed of oxygen and hydrogen; every nine tons of water contain eight tons of oxygen and one of hydrogen. Now, we can easily separate the hydrogen from the water. Thus, we can put something in to take away the oxygen, and the hydrogen will be liberated. Potassium has a most powerful affinity for oxygen, and if we put it into the water it will combine with the oxygen, forming a substance called potash; and the hydrogen of the water will thus become liberated. Now, this operation is a regular and actual decomposition of water. The water is thus decomposed, the hydrogen is liberated, and the heat produced by the union of this piece of potassium with the oxygen is so great as to set fire to the hydrogen as soon as it is liberated on the surface of the water. This is a real combustion of one of the constituents of water; so that this experiment shows that the operation of " setting the Thames on fire," which we so often hear spoken of as an impossibility, would be no difficult task if we only had a sufficient quantity of potassium (*Hear, and a laugh*). If we *had* this quantity, we could completely burn and dry up the Thames itself; for we have here seen water decomposed, dissipated, and sent off into the air. Now, the hydrogen which we have thus eliminated and set free can also be liberated by other means; we can decompose water in other ways. Let us take a piece of zinc: this zinc has a powerful attraction for the oxygen of the water, but not so powerful an affinity as the potassium. You all know what oil of vitriol is; and if we put some sulphuric acid or oil of vitriol to the zinc and water in this bottle, we shall have the hydrogen of the water liberated very rapidly. I will apply a light to the issuing stream of gas. You now see it burning; and the hydrogen which is thus burning is the description of gas which formerly was used for the purpose of inflating and sending up air-balloons. But now the common gas of the streets is applied to that purpose; and the gas of the streets differs from this only in this respect—that it contains a portion of charcoal, and is therefore heavier. When this gas burns it unites with oxygen, because it finds oxygen in the air on every side of it. This re-union of oxygen with hydrogen reproduces water. This is easily shown by holding over the flame a cold glass jar, when the moisture produced is immediately deposited. You perceive that there is; in fact water has been deposited; for, when the hydrogen unites with the oxygen, water is the result. Thus you have seen water decomposed, and the hydrogen liberated from the oxygen; and, on the other hand, you have seen them united again, and water re-formed, the glass vessel being covered with dew by the re-formation of the water. The following figure shows the method of performing this experiment—

Fig 2.

Decomposition and recomposition of water.

You thus become aware that water is composed of these two awkwardly-named bodies, called hydrogen and oxygen; one part of the former, and eight of the latter.



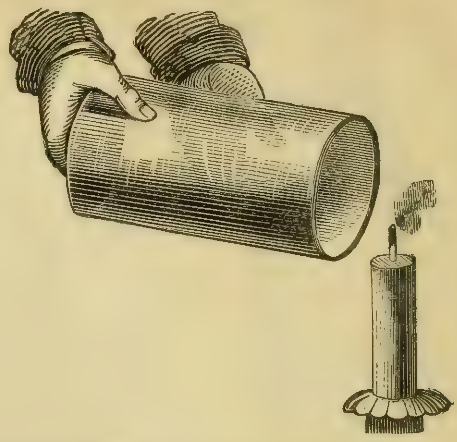
Water acts not only in carrying up certain substances to your plants, but also becomes decomposed by those plants, with this difference in the operation, from my experiment—that whereas I have retained the oxygen and liberated the hydrogen, the plants do exactly the reverse—they retain the hydrogen and liberate the oxygen. The next substance upon which I shall speak is nitrogen—so called from being contained in nitre and saltpetre. You have all heard of ammonia—that substance which is put in the smelling-bottles of ladies, to keep them from going to sleep at church (*laughter*). Now, ammonia is a matter of exceeding importance to the farmer; and it is a compound of nitrogen and hydrogen. It is composed of fourteen parts of nitrogen and three of hydrogen, and is very essential to vegetable growth; for, when I tell you that all those portions of vegetables capable of affording flesh must contain nitrogen, you will readily see its great importance; for no animals could live upon vegetables which did not contain nitrogen. All animals contain a large quantity of this nitrogen: as do also the hair, hoofs, and horns. Now, many experiments show that nitrogen is almost always taken up by the plants in the form of ammonia. Most manures contain ammonia. Guano of the better descriptions contains 20 per cent. of it. I will now separate the ammonia from a specimen of very fine Peruvian guano which I have here; I will mix a little lime with it, and that will set the ammonia free; and you will then soon know what I mean by ammonia. You smell the same thing when in the morning you go into a stable which has been closely shut up all night. In all stables where the ventilation is not well attended to you will discover the odour of ammonia. I mention nitrogen now, but I shall speak of it more particularly when I come to treat of the formation of mixens and farm-yard manures. There is a great quantity of nitrogen in the form of ammonia brought down by the rain every year. There is as much, probably, brought down each year in this way as is taken up by any crop; but then it is not all brought down when the crop is growing, and the consequence is that a certain portion of it passes away by the drains, and is lost. I will next treat of carbon, or charcoal. You all know what charcoal is, and how you make it by piling up wood, and burning it with just sufficient air only to allow the combustion to go on. Now, this carbon, or charcoal, is a remarkable substance. It is the very same substance as that of the diamond, and that most valuable gem is nothing else than pure crystallized charcoal; a pound of diamonds is nothing else than a pound of charcoal. This has been proved by chemists; the one has been shown to be identical with the other, with this difference only—that the diamond requires a higher temperature to burn it than the other. Charcoal is the main constituent of your vegetables; it forms what I may call the bony work of them, the main part and woody fibre of them. And whence do they get this charcoal? It is not from the soil. Look at the volcanic ejectments of Etna and Vesuvius; you find that the lava in the course of a few years cools down and cracks, and the wild fig-tree will send in its roots and flourish; and, although there was no charcoal there before, plenty of charcoal will be found in these trees. The same will take place with plants that grow on granite rocks; there was no charcoal in these rocks, but plenty will be found in the plants. Where, then, do they get it from? They must get it from the air; and they do get it from the air. The common air contains one two-thousandth part of carbonic acid gas (a compound of charcoal and oxygen), and the plants take this gas up from the air. I shall make you better acquainted with what I mean by carbonic acid when I tell you that it is the effervescing matter which you see in soda-water, or which comes from bottled porter, or which sparkles up in the glass of champagne; which collects in brewers' vats and wells, and which has killed hundreds of people who have gone down into vats and wells without taking the precaution of having recourse to ventilation. This gas is of great importance to plants, and they derive all their charcoal from it—from this carbonic acid gas, of which I have been speaking. Your oats, wheat, turnips, &c., how do they get their charcoal? Why they spread their leaves out to the light of day, or to the sun when shining; the roots take up a certain degree of moisture and mineral substances from the land, which are carried up into the leaves, and when there (in the light of day, not otherwise) they give the leaves the power of acting upon the carbonic acid gas in the atmosphere, retaining its charcoal, and sending back the oxygen. This never takes place except in the diffused light of day, or a full sunshine. But the operation takes place more rapidly in the full sunshine than under any other circumstances, especially if there be a nice steady breeze blowing at the time; for, as the air contains only one two-thousandth part of charcoal, a portion of air will soon be robbed by the plants of all it contains; but, as the breeze brings a fresh supply of air, there will be a fresh supply of charcoal also, and consequently it must be evident that the operation which I have described will take place much more rapidly when there is a nice breeze blowing, with sunshine, than when there is not

(Hear, hear). Now, you will perhaps imagine that a large tree, like the oak, would never be able to take up all the charcoal it contains from the atmosphere; but, have you ever considered how many square yards of leaves it spreads out to the air? Why, it spreads out a surface of not less than 300 or 400 square yards of leaves, by which to seize and arrest the charcoal from every passing breath of air (*Hear, hear*). But you may say, if the plants are always carrying on this operation, won't the air, in time, lose all its charcoal? Why, yes, it would, were it not that the animals and decomposing vegetables are as constantly returning it. This is done with vegetables by the act of the reaper, or by the axe of the wood-cutter, under the operation of that indefatigable agent of which I have already spoken, called oxygen. For, no sooner does matter become dead and inert than the oxygen immediately comes and claims its former partners (the charcoal and hydrogen), and off they go again together as carbonic acid gas and water *(cheers)*. The food which you eat, and the food which all animals eat, undergo precisely the same action. All the food we eat does not pass off in excrementitious matter, neither is it all expended to form the muscles of our bodies; a great part is expended by respiration—by the action of breathing. At every breath we draw we take a certain quantity of air, and give something back in return; we take in the oxygen of the air, and give back carbonic acid and moisture derived from the action of the oxygen on the charcoal and hydrogen of our food.

The substance called chalk, with which you are all so well acquainted, contains a large quantity of this carbonic acid, which can easily be liberated by means of a stronger acid. I will liberate a little from this chalk. I will put some chalk into this jar with some water, and pour in some spirits of salt; and you will find that the gas will at once become liberated. This gas, I should tell you, will not support flame: you see perfectly well that this candle is now burning brightly; but if I pass the candle into the vessel of gas which is now being liberated from the chalk, it will at once be extinguished. (Experiment performed.) This gas—this carbonic acid gas—which you now see generated from chalk, is the same that is produced by the fermentation and decomposition of all your manures. I will explain to you how it is that this gas gets to the bottom of wells and vats: it is simply from this reason—that it is heavier than the atmospheric air. Now, I will make a little more of it: I have now a sufficient quantity to extinguish this candle. This gas being nearly twice as heavy as the air, I can pour it out of one vessel into another with the greatest ease. I have now poured some gas into this vessel, and you see by pouring it out upon the flame of the candle I have extinguished it. Fig. 3 represents the method of performing this experiment.

You cannot see the gas itself; you cannot behold it; but it, nevertheless, exists, and you can see its effects. I will now show you a property which this substance has of giving to lime-water a white colour.

FIG. 3.



Candle extinguished by an invisible stream of carbonic acid gas.

You perceive that as soon as I pour a little lime-water into the vessel containing the carbonic acid, there is a curdy precipitate; and this precipitate is exactly the same substance as that from which I originally prepared the carbonic acid, viz., carbonate of lime, or chalk. From the lungs of man, and other animals, the same gas is given out as that which was evolved by putting the acid upon the chalk. The very gas which the vegetables require for their growth is given out from the lungs of animals, as you will see by a very simple experiment. I will take this glass vessel of lime-water, and, with a tube, breathe the respired air of my lungs into it; you see that there is the same white precipitate as there was in the other experiment—a conclusive proof that the gases are identical (*applause*). The same white precipitate may be obtained from the gas produced by burning paper. This is the very substance which the plants require, and the air is the great receptacle from which they derive it. Now, nine-tenths, or I might say nineteen-twentieths of the substances of your crops are derived from the atmosphere. The charcoal they derive from carbonic acid gas; the nitrogen from ammonia; the hydrogen from water.

The mineral ingredients contained in the soil are several: you see them on this diagram:—

Constituents of Soils.

Potash
Soda
Lime
Magnesia
Iron
Manganese

Alumina
Chlorine
Fluorine
Silica
Phosphoric acid
Sulphuric acid.

Of these bodies *Fluorine*, *Manganese*, and *Alumina* are found in plants in only minute quantities; and it has yet to be determined whether their presence is essential or accidental. *Silica*, or soluble sand, is found in most plants, and *Phosphoric acid* (the base of bones), united with *Lime*, *Magnesia*, *Potash*, or *Soda*, is found in the seeds of all plants yet examined.

Soda is found in the ashes of all sea-plants; and *Potash* can be procured from the ashes of most land plants. *Magnesia* is the base of Epsom salts. *Lime* every body knows. *Iron* is also well-known; it is found in plants and the soil generally in the state of the red oxide, or rust of iron. *Sulphuric acid* is made of sulphur and oxygen, and is well known under the name of oil of vitriol. *Chlorine* united with hydrogen constitutes muriatic acid or spirit of salt. Common salt contains *Chlorine* and *Soda*. Every plant will, if possible, take something from the soil, to enable it to take something from the air. But if the roots cannot take that which is necessary out of the soil, the leaves are not in a condition to take that which is required out of the air, and accordingly the growth of the plant does not go on in a satisfactory manner. Your object is not merely to get returned to you, ear for ear, the corn which the land has previously grown—you want to produce a hundredfold by the application of every scientific improvement, and every new and scientific suggestion. One of the most important of the mineral ingredients is phosphoric acid (contained in bone-dust); and I will speak of this first as being of primary importance: all animals require it to form the base of their bones; and they must derive it from the vegetables upon which they live. If you attempted to feed them upon vegetables which did not contain any phosphoric acid, they would not grow at all. If the Almighty had intended them to live without bones, they might have grown upon food not containing phosphoric acid; but as that is not the case, they must have it. You have it in many soils; but owing to the practice of mankind, which prevails, of burying bodies in places of interment separate from the land, and owing to the bones of cows, horses, and sheep never having been put back into the ground, it happens that bone-dust is generally contained in the ground in much smaller quantities than is desirable or necessary to give many plants this acid in sufficient quantity. For thousands of years the bones of animals have never been put back again into the land, and consequently there is a deficiency of this substance unless applied by artificial means. When, however, a farm has got up to its proper pitch of cultivation in this respect, it requires very little to keep it so. Another of these important substances is potash: it is required in large quantities by most plants, and especially by turnips. It is this potash which enables the leaves to absorb the carbon or charcoal; and without a sufficient quantity of it, you will never get the carbon absorbed. Then lime and magnesia are both requisite, as both are found in the bones of animals. Iron, also, is found in the bodies of animals: you could not live without iron. By its action with the oxygen certain vital forces of the body are liberated; it is the oxide and peroxide of iron which are the principal agents in the circulation of oxygen in the system. Alumina, or clay, is found in almost all good soils; but, singular to relate, it is only found in the most minute quantities in plants. I have in one or two instances discovered a small quantity, but so very minute as to leave it doubtful whether it did not proceed from some of the impurities of the soil which had adhered to the plants when pulling them up. It has a great attraction for ammonia, and if made red hot the ammonia will immediately be smelt. I will next touch upon silicic acid, or soluble sand, as a substance of very great importance to you. Now, glass is only a composition of silica and soda or potash. The stalk of wheat, you have no doubt observed, has a glassy appearance; in point of fact, it has a perfect coating of glass over it, which is produced simply by the union of silica with potash or soda. The object of this coating is doubtless to protect the plant against the attacks of insects, and to strengthen the stem. There are two sorts of silica; one that is soluble, the other that is insoluble. It is with respect to these two kinds, something like the substance resembling coal which was found in a certain part of America. The persons who discovered it said, It looks like coal, it smells like coal, it tastes like coal—it must be coal. But the only difference they could discover between it and coal was, that the one would burn and the other would not *(laughter)*; and the only difference between these two kinds of silica is, that one is soluble and the other is not. But silica is not generally soluble unless previously combined with potash or soda. Granite rocks contain it in large quantities; and in these rocks you will see pieces of a white substance, in six-sided crystals—this is feldspar. The granite rocks are the oldest rocks we have, and they contain about 17 per cent. of feldspar, and 60 or 70 of silica. The carbonic acid in the air has a great attraction for silica, and readily unites with it. All our river waters contain soluble silica; all your soils contain some silica and potash which is not quite decomposed. It is the soluble silica that becomes available for plants; and the more rain you have, the more of it becomes soluble. The straw of your wheat not only requires a great deal of potash and silica, but also a great deal of bonedust. In a wet or damp spring you will have a large produce of straw, and a small produce of wheat; in a fine season, on the contrary, you will have a small produce of straw, and a splendid yield of wheat *(Hear, hear)*. Now, how does this arise? Why, probably in this way. Owing to the larger quantity of rain falling, there is a larger quantity of silica disintegrated and taken up, as well as an increased quantity of the bonedust. You get a double quantity of straw, and you get a double quantity of phosphoric acid taken up; and when the time comes for forming the ear, there is no bonedust left for the purpose. Now this is the reason why in a wet spring there is always a large supply of straw, and often a small supply of grain. This, however, can be remedied by putting a larger quantity of bonedust into the land. I now wish to refer you to your own farmyards. I shall address you in plain and familiar terms. I do not want to play the orator, but rather to take the part of the teacher, if I can succeed in so doing *(cheers)*. I wish first to speak to you about ploughing. There are all kinds of theories respecting ploughing, the use of fallows, and the use of draining.

Now these operations are intimately connected together. In the first place, what does the plough do? I will show you. Every year the atmosphere must make soluble a number of the chemical substances to which I have alluded (I need not go over their names again), to be taken up by your plants; otherwise those plants will not grow. The atmosphere is always acting on the land. Now suppose it is acting on an acre of land, and you take the plough, and throw up the soil to a depth of six, eight, or ten inches. After you have done this, only perceive on what an extent of surface it then operates, compared with what it did before the acre had been ploughed, and when the upper surface only could be acted upon. By thus opening up the land you let in the atmosphere; the soil is disintegrated, so as to set free the largest quantity of those necessary substances for the succeeding crop. I can imagine gentlemen saying, "If I were to stir that land to the depth of eight inches, I should never get anything to grow." But could you not subsoil it first? *(Hear).* Messrs. Drewit, of Guildford, have actually ploughed into chalk, and made a soil for themselves. But they manure well, gentlemen *(Hear).* Ploughing is comparatively of very little use unless deep: it is perfectly absurd to see them in Norfolk ploughing to the depth only of two inches and a half. I think they are wrong because they prevent the action of the atmosphere upon the substances of which I have been speaking. Now what do fallows do? Why the very same thing. They leave the land exposed to the action of the air: but by ploughing deeply you accomplish the same end. (A member observed, "Fallows are pretty well out of fashion now"); so that fallows are nothing more than an assistance to the plough. It is, however, unnecessary; you can always do without it, except in cases where there are great quantities of weeds to be eradicated, and these should never have been allowed by a good farmer to get ahead. A spring fallow for turnips is quite sufficient; but a fallow in the early part of the spring is all that ought ever to be attempted. For it is much better to have green crops, and plough them in, than to have any fallow at all. Well, then comes the draining. Draining acts in two ways: one way in assisting the operation of opening up the land to the action of the atmospheric air, and the other in taking away the redundant water from the roots of the plants. The water either arises from springs in the land, or it falls from the heavens. That which arises from springs is generally best got rid of by boring; and that which falls upon the surface, you do not want to take off the cream of the joke, or, what is the same thing, the cream of the land. You want it to percolate; so that all the substances alluded to may let very little else than pure water go away. There has been a good deal of talk about the respective merits of deep and shallow draining. My opinion is, that deep draining is much the best. The marrow of the land lies between the drain and the surface: the marrow of these useful substances will with deep draining be retained, and the water will run away slowly. Draining acts also in another way. After you have made a drain, you will soon observe a great number of fissures in the land. This will be the case even in the *stiffest* clay. These fissures rise up to the very surface, and allowing the air to get in, the same effect is produced as by ploughing. This is constantly at work; as the water goes down, the fissures are left open. Thus there is a constant action of air and water—air and water which are of the greatest benefit to the plants of the soil, in liberating those useful mineral substances (*Hear, hear*). Now the drains prevent an excess of water, which is a great object to be accomplished; for the moment the plants have had enough, that which remains and was useful at first, now begins to act as a poison. Draining is also highly beneficial in carrying the water off the surface of the land: if it lies upon the surface of the land, it has the effect of cooling it; and you all know that you want heat. You well know the difference between what is called cold land, and a warm, genial soil *(Hear);* and this difference mainly depends upon the presence or absence of an excess of water. If you have your land covered or saturated with water, the sun is employed only in evaporating that water instead of heating the land.

The next point to which I propose to call your attention is the process of making mixens, and manures in general. Now these manures must consist of oxygen, hydrogen, nitrogen, and carbon, with the mineral ingredients before mentioned. Your manures are made up of vegetable matter, straw, and animal excrement. Some people think—I have met with many people who think, that the lands derive great advantage from sheep being put upon them; they imagine, if they put a flock of sheep upon twenty tons of Swedes, that these sheep have some unaccountable way of benefiting the land. Why, they cannot put anything upon the land which they do not derive from the turnips. They have no power of making manure themselves; they will in fact take something from the land. Twenty tons of turnips rotted in the land would give more manure than the sheep will give by eating the same amount of turnips upon the land. I do not say that it is better to rot your turnips than to feed your sheep upon them, but I am stating a matter of fact in relation to the comparative amount of manure to be derived; and I repeat, that the whole of the manure which they can put upon the land, they derive from the turnips. When you use hay, or linseed, or oilcake, in addition to the turnips, you are adding manure to the land, for the major portion goes upon it: These sheep, then, derive the whole of their manuring power from the food which they consume; bullocks do the same. Where do the vegetables derive their sustenance?—From the mineral substances in the land; from the air; and the principal of those from the air are carbon and nitrogen. The carbon is there in sufficient quantities, but the nitrogen it is well to supply in the form of ammonia. Your mixens consist of the fodder from the cattle, their excrement, &c., all put together in a heap in your farmyards. These yards are generally made with a gentle slope down to the horsepond; then the outhouses and sheds are constructed with the greatest ingenuity, so that all the urine may run away from the mixens; care being taken that the whole shall be well washed by the drippings from the outhouses, and that all the washings shall be drained off into the horsepond (*"Hear," and laughter*). Why, I believe,—I know it has actually been conjectured by some people that this mixture, this part of the manure which would be invaluable to vegetables if preserved, was beneficial to the animals which drank out of the ponds. Now allow me to say, that I believe that one half of the consumptions in cattle arise from their drinking this abominable mixture: diseases of the lungs must be generated by drinking such a compound. Putting this matter, however, out of the question, this urine and this soluble matter which are thus washed away are the most valuable portions of the manure. By allowing these to run off, you take from your manure the potash, the soda, the chief part of the phosphoric acid, as well as the greater portion of the soluble silica, and all the ammonia (which is quite soluble), and all the nitrogen compounds which decompose into ammonia. In short, at the most moderate computation, one-third of the manure is washed away and utterly lost *(Hear, hear)*. The farmer in many cases loses as much as half his rent by allowing the rain to wash away that which is the most useful part of the manure. These soluble portions of manure are most easily taken away, and therefore they ought to be taken most care of; yet, according to the general practice, they are allowed to run away as if they were of no value. I wish to say not only to the farmer but to the landlord also, that the construction of farm-buildings is a matter of the greatest importance to both. For those very substances which you allow to be washed away, you have to supply either by the purchase of guano, oilcake, London dung, or some other substance. Mr. Warnes, of Trimmingham, in Norfolk, has adopted an excellent plan for preserving his manures. He has sheds constructed in the yards, open on one side only, in which the cattle stand with their heads towards the rack or manger, and their tails towards the open yard; each beast stands in a sort of box (without being tethered), sunk about one foot deep into the ground; the bottom is covered with straw; and as the boxes get full, the manure is carried away and nothing is lost; all the liquid portion of the manure gets absorbed in the more solid parts, and the cattle are kept admirably clean. I went into these sheds myself, examined the cattle, and found that their hoofs were perfectly clean; in fact, I do not think there is a better practical plan adopted than that of this gentleman. He some time since published many letters on "Box-feeding;" and he has just published a work "On the Cultivation of Flax," which I can highly recommend. (A gentleman here asked Mr. Nesbit, whether he did not think flax-growing injurious to the land). Mr. Nesbit replied: I do not think it is; and I know that is Professor Kane's opinion also. By Mr. Warnes' method, all you want is a box for each beast, two feet deep, with a compoed bottom, and you then lose nothing. Nothing goes away, because there is nothing to wash it away. The straw absorbs all the liquid; for straw, bear in mind, will absorb its own weight of fluid. Having now come to the end of my remarks, I beg to say that I shall be happy to hear gentlemen present put as many questions as they please; and it will afford me great pleasure to answer them *(cheers)*. I always think myself that the little discussions which follow the lecture are the best part of the business; because matters are suggested by different minds which might never occur to the lecturer on a subject embracing so wide a field *(Hear, hear)*. Before I sit down, however, I will say a word or two upon guano. The value of guano depends principally upon the presence of bone-dust and ammonia; as to potash, it never contains more than from 2½ to 4 per cent. of that; this guano is the excrement of seafowls which feed upon fish. You know of how much importance sprats and other fish are in the manuring of land, simply because they supply bone-dust and ammonia; and in these respects guano is a very important manure. But I want the farmer to save manure for himself. It is of no use to go and spend £200 a year on guano, and then let the best part of your manure run out of the yard. I do not think there are a hundred farms in the whole country that would not be benefited by the application of more manure. This sample of the best Peruvian guano which I now have before me, contains 20 per cent. of ammonia, and 20 per cent. of bone-dust; this other sample of Ichaboe guano, about 12 per cent. of ammonia, and more bone-dust. In purchasing guano you are very likely to be taken in, unless you are very cautious. I have known some of the dealers adulterate it to the extent of 34 per cent. When you want to buy, do not go to the dealers at all, unless satisfied of their probity, but go directly to a respectable importer, and then you will not be cheated. There is another thing that I will advise, and that is never to apply guano by itself. I told you that guano contained only from 2½ to 4 per cent. of potash; now the ashes of peas contain 35 per cent., beans 21 per cent., and wheat 24 per cent. of this substance. Consequently, if you were to use guano constantly and by itself, you would impoverish the land; therefore, always put with it either saltpetre or nitrate of soda, wood-ashes, or other bodies of the same composition. Make it a rule always to mix your manures. The mere fact of mixing them is one of the greatest points next to being chemist enough to know the exact and proper quantities. Put farm-yard dung with it one year, lime another, and nitrate of soda another; changing each year, so as gradually to work the whole of the farm up into the same state. It is very desirable to equalize the state of your farm all round; there are very few who have their farms of equal quality throughout. But the best way to attain to this is to make frequent changes in your manures. Another very good manure is common salt; it is exceedingly valuable in many cases, especially where the land is sheltered from the sea. I know a gentleman residing near Guildford who has applied as much as 4 cwts. per acre of salt to his land, and says it is the cheapest manure he ever uses; it makes the straw beautifully yellow. Now nature disseminates salt to a great extent; and you ought to help nature in circumstances when there may be anything to impede this operation. I have known all the windows and trees in a town to be covered over with a thick incrustation of salt after a storm, when the wind was blowing in from the sea; and in some cases salt will travel in the atmosphere as much as 150 miles from the ocean before it is deposited. In conclusion, gentlemen, I beg to say that I feel I have placed this important subject very imperfectly before you *(No, no)*. If, however, I shall have scattered a new thought here and there, and conveyed any information which may be turned to account, I shall feel the greatest satisfaction in having met you here this evening *(cheers)*.

J. A. Gordon, Esq.—I think, gentlemen, you will all agree with me when I say that we have heard Mr. Nesbit's admirable lecture with great pleasure; and that we have also derived from it a considerable amount of instruction *(cheers)*. I therefore beg to propose that the thanks of this meeting be accorded to that gentleman *(renewed cheers)*.

William Jenney, Esq.—I have very great pleasure in seconding that motion.

The thanks of the Association were immediately carried by acclamation.

Mr. Nesbit: Gentlemen, I beg to return you my best thanks for the warm and handsome manner in which you have expressed your approbation of my imperfect efforts. I can only say that I am quite at your command, and I trust I shall have a perfect shower of questions (*cheers*).

Mr. Pope: When I have applied guano, I have generally also applied nitrate of soda or potash about three weeks afterwards.

Mr. Nesbit: That is a very good plan. With regard to arresting the loss of ammonia from your mixens, I would suggest that, if you *will not* follow the plan which I have described to you, adopted by Mr. Warnes, of Trimmingham, that you should make them in this way: If you *will* have them in the open air, lay down a bed of ditch-stuff; upon that put about a foot and a half of the dung, &c., which comes from the cattle, and upon that scatter some gypsum; then place another layer of dung and add more gypsum, and so on to the end. Observe not to have it laid too light; for if you do, it will heat, and may take fire. You must not make it too light nor too heavy, but just light enough to keep it warm; if it gets too warm, press it well down. You should also have shoots or gutters in your farm-yards to carry off the water. Where this is done I don't care so much about the rain of heaven, because the straw absorbs so much. In this district there are not more than 24 inches of rain in a year. In the north part of Lancashire and at Keswick there are as many as 57 inches.

Mr. Pope: Manchester is very bad.

Mr. Nesbit: Manchester and London are pretty nearly on a par. In London there are 28 inches and at Manchester about 30.

A Member: How often is it found necessary to clean out the cattle boxes of which you were speaking?

Mr. Nesbit: About once in six weeks. You would be surprised at the condition of the animals when that plan is adopted—so different from those which are running about the farm-yard. In fact, there is no comparison between them. They were fed upon turnips and linseed, mixed with pea-haulm, &c.

Mr. Pope: Mr. Warnes asserts that he can produce as much meat with six pounds of this mixture on his plan as he could with twelve pounds of oilcake on the ordinary plan.

Mr. Nesbit: If you were to expend as much money as the Duke of Devonshire has upon his conservatory at Chatsworth, I do not think you could much improve on Mr. Warnes' plan of sheds. Perhaps the cattle might be kept a little warmer by having the sheds closed in. If this were done in a manner consistent with ventilation, it would be an improvement, as at present the wind rolls in and cools them; and it would be better to have them kept in an atmosphere of a nice genial temperature. The great defect of Lord Torrington's plan is, that the ventilation is bad; and no system will answer where the ventilation is bad. It is highly important that cattle should be kept in well ventilated buildings. Why, a bullock consumes 79 ounces of charcoal, and destroys 13 hundred cubic feet of air, in a day.

Mr. Pope: I rather think it is better to have one side of the sheds open.

Mr. Nesbit: Why you must recollect that if you do not keep the animal warm by artificial means, he will consume a certain part of his food to keep himself warm, instead of for the purpose of making fat; and it is much better to warm him with a pound of coals than with a pound of food (*hear, hear*).

Mr. Dawe: You were speaking, Mr. Nesbit, of sulphate of lime or gypsum. Now, there is a general impression that where there is a deficiency of that you cannot grow clover, but I have not found that to be the case.

Mr. Nesbit: Wherever you have *hard* water gypsum is of no use at all—this you may take as a general rule; but where you have not lime in the soil, it is of great use.

Mr. Dawe: I think too much importance attaches to the use of gypsum.

Mr. Nesbit: This is a question of some importance. You will recollect that I stated that sulphate of lime acted beneficially by preventing the volatility of ammonia; but it acts directly in supplying one of the mineral constituents of the crops.

Mr. Dawe: I have found the ashes of burnt wheat very productive. I had a rick of wheat accidentally burnt, and I used the ashes for manure; the consequence was as good a crop as I could have had from guano *(Hear)*.

Mr. Nesbit: Exactly so. Now does not that prove just what I have been saying with regard to manures? viz., the value of the mineral ingredients.

Mr. **Dawe**: You certainly could not have a better proof of what you have stated.

Mr. **Nesbit**: By the application to the land of the substances required by the plant, you make it productive. But if you use manure not containing the whole of these substances, you will impoverish the soil. In the burnt wheat you had all you wanted.

A **Member** asked if there was not sulphuric acid in the ashes of wheat?

Mr. **Nesbit**: Yes, a small quantity—from 2½ to 4 per cent.

Mr. **Griffin**: I very much agree with you in what you have said respecting the growth of straw. I have always found that in wet seasons I had a large quantity of straw, and a deficiency of yield in the ear.

Mr. **Nesbit**: You will always find that to be the case. Wheat only contains 2 per cent. of silica, and the ashes of the straw contain 60 to 70 per cent., and in wet weather this is conveyed very freely from the soil to the plant. Of phosphoric acid the ashes of the wheat contain 45 per cent., and those of the straw only 10 per cent. But the straw weighs a great deal more than the ear. The principal things for the growth of straw are silica and potash. They are derived from the land in great abundance in a wet spring; and the straw growing up rapidly, takes the phosphoric acid which would otherwise have gone into the grain. This happens from the straw being "first in the field;" and when the wheat comes to demand its share, where is it to be got? *(Hear)*. When there is this deficiency in the ear, you will often observe that the leaves turn yellow.

Mr. **Griffin**: I have found that to be the case when I have used saltpetre.

Mr. **Nesbit**: Precisely so. If you use saltpetre you should use guano or a similar manure.

Mr. **Griffin**: I do not myself think guano a very genial thing.

Mr. **Nesbit**: Where do you get your guano pray? Now I am an apostle of agricultural chemistry, and think nothing any trouble which relates thereto. If, when you are about to purchase guano, you will send me a specimen of it, I will analyze it, and let you know its precise qualities without any expense *(cheers)*.

Mr. **Pope**: With regard to deep ploughing, may it not be bad economy in a wet season?

Mr. **Nesbit**: That is a question, Sir, which I should not like at present to take upon me to decide. Mr. Warrington, of Apothecaries' Hall, took a bitter extract, and filtered it through some animal charcoal or ivory black; and when this solution came through, it had some of the bitter taste left. He then took some sulphate of quinine, and performed the same experiment. The liquid passed out perfectly pure in this instance, as in the former: in fact, the charcoal had retained all the original qualities. He then tried Glauber's salts and Epsom salts, and the result was the same. I therefore think that perhaps the capillary attraction of the earth will retain most of the essential qualities. For instance, if you send water through the land with 20 per cent. of salt in it, it may not contain 10 per cent. when it comes out.

Mr. **Gordon**: What do you think of land producing wheat 18 times without a fallow? What composition of soil would that be?

Mr. **Nesbit**: I cannot tell without seeing it, or knowing something of its situation.

Mr. **Gordon**: It is in the parish of Mere.

Mr. **Nesbit**: "Mere"—that looks like water.

Mr. **Gordon**: Oh, I will admit it is an alluvial soil.

Mr. **Nesbit**: There you come to the point at once. *(Hear, and a laugh)*. A friend of mine tells me that in the marshes of Erith and Dartford, whenever they put any manure on the land, they always diminish the crops. The fact is, the lands are, in both cases, supplied with both mineral and organic substances from the neighbouring rivers.

Mr. **Pope**: There are farms in Essex of the same character.

Mr. **Nesbit**: Yes, that is just on the other side of the river. There is no more productive land in the kingdom, perhaps, than that of the Plumstead, Erith, and Dartford marshes.

Mr. **Pope**: What do you think, Mr. Nesbit, of the sewage company?

Mr. **Nesbit**: Why, Sir, I would not take shares in it *(laughter)*.

Mr. **Gordon**: Mr. Smith, of Deanston, told me that they were about to bring down the sewage from Aberdeen upon a large tract of sand near that city, and convert it into a soil. Do you think that practicable?

Mr. **Nesbit**: Oh, yes, it is practicable enough; but the question is, will it pay? *(hear)*.

After some further conversation, Mr. Nesbit announced to the meeting that his lectures would from time to time appear in the *Mark Lane Express*; and the members of the association then separated, expressing their warm satisfaction with the instructive address which that gentleman had delivered.

THE NORWEGIAN HARROW.

The following is an extract from a letter received by Mr. Stratton from a gentleman of high standing as an agriculturist in Cumberland, on the merits of this implement. The writer, in answer to Mr. Stratton's inquiries, says:

"Your Norwegian harrow I can, from my conscience, say, is the most valuable and masterly implement I have ever seen or used. I can hardly say too much for it.

"In the first place, I will answer your questions *seriatim*, and afterwards make remarks on points on which they do not touch, but which, by practice and close observation, I find of great consequence.

"Question 1.—My land is called light land, but at the same time possessing sufficient allumina to make it cake, and bake into very hard and large lumps in dry and hot weather, such as no common harrow can have any effect upon.

"2nd.—My Norwegian is five feet wide. In the first field, very rough and hard, I used two powerful horses (the rowels working at a half depth) equal to draw a ton load each in a single horse cart on our hilly turnpike roads. They completely pulverized five acres in six hours; but it was very hard work—too severe. I afterwards employed three, putting the rowels at two-thirds their depth, in a fresh field, which was full work for them. I then applied four horses in the latter field, and drove them at a greatly increased speed, which was sufficient work for them. Four ordinary good farm horses are required for my sized implement on land without hill. The horses were worked four abreast, one man managing horses and implement.

"When I drove the implement at an increased speed, the perfection of the work was increased cent. per cent.; the clods were reduced to complete powder; but not so when going at a slow speed, in which latter case they were left the size of duck's eggs. As the speed is increased, the perfection of work is increased in a *compound* ratio; therefore speed, and plenty of power to accomplish, is a great saving of expense; at a *quick* speed *no* land will require more than once going over. The surface is greatly refined by your implement, but the under ground much more so. I used it in a field filled with a black kind of wiggy couch, which formed hard clods bound together by this matted rooted grass. The implement made them quite loose, so that when the common harrow passed over lengthways and crosswise, a single turn of each, roots were brought to the top completely free from earth. I likewise never saw land before so easily, deeply, and perfectly harrowed: they did not give a single jerk, but swam upon the land as in water, the teeth buried to the wooden bars, and bringing the roots up from their whole depth, and which I had gathered up and burnt close after the harrows, so that the roots were nearly burnt when the harrows were leaving the field, the plough following the burners, and stitching the land for turnips, the guano and seed being put in by drill in one operation; the land ploughed up light, fine, and open."

[The writer here suggests a few slight alterations, which he considers would much increase the efficiency of the implement—and thus concludes]:

"Altered as I have suggested, you may recommend your implement with confidence to all persons and all soils, and I am sure that not one can ever find fault with it, for, if properly managed, it will always do its work well: it saves a very considerable amount of labour in ploughing, harrowing, and enables you to gain that fine and loose tilth that no other implement can accomplish, besides the great saving of time in getting your land ready for the green crop. In stiff clays its value will be incalculable, as it will make them as easy to work in dry, hot weather as the light lands are."

IMPROVEMENTS IN AGRICULTURE.

EXTRACT FROM A LETTER BY MR. BATES, OF KIRKLEVINGTON, ADDRESSED TO THE LORDS SPIRITUAL AND TEMPORAL.

"After fourteen years of indefatigable attention to agriculture, I began farming for myself in 1796, now fifty years ago, on an estate bought in 1663, at £223 5s. The then purchaser occupied it forty years, and sold it at £1,000, above four times its cost price. Seventy years afterwards it was offered for sale, and was fourteen years upon the market; the grandson of the former possessor offered £2,500 for it; and when I commenced farming it, he said he would not have given more for it if it was then offered him. The first three years I occupied it, it did not pay the unavoidable expenses of its cultivation and management, and the rent was paid out of the capital I began with; yet, by indefatigable attention, skill, and judgment, in which there was no relaxation, the gentleman who would not give more than £2,500 for it, in the course of seven years afterwards (ten from my beginning to farm it) gave £14,000 for this same estate, ten miles from any market-town, and possessing no local advantages. After farming it for six years himself, he candidly acknowledged it was cheaper at £14,000 when he bought it, than it would have been at £2,500 when I began to farm it; and I can say with great truth, that I made every pound I began with into fifty before I had farmed ten years, although the three first years no rent could be made. I may here add, that this property (sold, as I have stated, at £14,000, in 1806) has since been greatly improved, having been occupied by the owner of the property himself; and I have no doubt it lies him in at present £25,000—an increased value of *ten times* in fifty years, and above *one hundred times* its cost in 1663, and yet yearly increasing in value. The next twenty years my whole capital was engaged in cultivating the soil and improving the live stock upon my farms; and with reference to this estate, which I bought in 1811, the former owner told me, in 1818, that my crops were worth more money than the land itself was worth when I entered upon it. And so it continued to improve, till in 1825, when estates in this same parish were sold at thirty years' purchase on the then rentals. Those estates do not at present pay 2 per cent. interest on the purchase-money, though considerable sums have been laid out in improvements both by owners and occupiers; but where no improvements have been made, one farm, thirty-five years ago, at a rental of £220 per year of two hundred and seven acres, the tithes of which made £100 per year, came in 1835 to £45 per year, and was let last year, and paid property-tax on £41 per year; and this is only one of many other farms which I can point out that are similarly situated.

"My own personal expenditure has not been increased; I have laid out every shilling I have received from the produce of the farms in improvements for the last twenty years, and yet my property would not sell for more than it was worth twenty years ago, as other estates were sold twenty years ago; and I could point out many other instances of the same: but what I state has passed under my own eye; and I have now been above fifty years an occupier. Those who know me are well aware I have done all I could to improve this property. Had I embarked in another occupation, twenty years ago, to which I had paid attention, my capital would have more than quadrupled: but I relied on the faith of Parliament continuing a proper protection; and now, alas! in three years all protection is to be withdrawn from agriculture, if Sir Robert Peel's measures become the law of this land. I can appeal to the Archbishop of York, under whom I hold a lease for a moiety of the tithes of this parish, under whom I renewed the tithe lease in 1821, and to whom I paid above five times the amount of the fine paid for the same in 1801, twenty years before; and wheat in 1801 was above four times the price it was in 1822; and butcher's meat in 1801 was also above four times what it was in 1822. These facts show the improvements I had made; and the commutation of the tithes on my own estate has been made at a higher rate than valued by the Archbishop's agent in 1820; although, on some estates in this parish, the tithes commuted for are not now of half the value they were in 1820.

"I might add many more proofs of the increased value I had made on farms I occupied, rendering one estate of more than double the value after an occupation of six years; and I shall send to the Duke of Richmond the testimony of three witnesses who on oath attested what I have here asserted, and can send the same to each member of your Right Honourable House, if desired, in a published document addressed to the late Bishop of Durham, sixteen years ago, and which has been before the public since that time."

TENANT-RIGHT.—DARLINGTON FARMERS' CLUB.

The June monthly meeting of this club was held on Monday the 22nd inst., at the offices of the Secretary, Mr. Thomas Dixon, when Mr. Darling, of Harewood Hill Academy, and Alfred Kitching, Esq., of Darlington, were enrolled members of the club.

Mr. Walton presided, and said: Gentlemen,—The subject which we have this day met to discuss is one that very nearly concerns us all; viz., "the question of Tenant's Rights, in compliance with the suggestions of the London Farmers' Club, with a view of ascertaining if a system of leasing farms could be adopted more to the advantage of both landlord and tenant than the present mode, and also better adapted to a profitable and improved cultivation of the soil." This subject was adopted by the committee in the hope of obtaining the sentiments of the club generally thereon; and therefore we should at once be glad to hear the opinions of any members present; but as it probably may be expected that some of the committee may say something on the subject, perhaps our secretary, Mr. Dixon, will say a few words by way of introduction.

Mr. Thomas Dixon said: Mr. Chairman and Gentlemen,—The question of tenants' rights is one of more than ordinary importance to us all, and consequently it is one that will require more than ordinary attention. There has in this matter, as in many others, been a great diversity of opinion as to whether long leases are actually requisite to bring about a more secure, profitable, and satisfactory system of cultivation than at present generally exists in this part of the kingdom; or whether a judicious system of tenants' rights could be adopted that would answer every purpose. However, be that as it may, we may feel quite sure from the amount of dissatisfaction which has so frequently and repeatedly been expressed by the tenant farmers, that the present general system of tenancy from year to year is not what it ought to be, and therefore it is desirable that improvement should be aimed at. Now, up to this time, there has, I believe, existed with tenant farmers generally a degree of diffidence on their part as respects the discussion of this question; I mean, a dread of giving offence to their landlords, which fear I think was quite uncalled for; as in this matter it seems to me quite evident that if a judicious system of leasing farms can be adopted, it must be mutually for the benefit of both parties; for the great object in having longer leases, or a better system of tenants' rights, is to stimulate the occupier to a more liberal, a better, and more profitable mode of cultivation, in order that he may receive a better and surer return for capital, labour, and skill expended on his farm, whilst at the same time by improving the land by better cultivation, it must of course be an advantage to the landlord also. Now, gentlemen, I am decidedly of opinion that tolerably long leases are requisite to insure really good cultivation; for the very fact of a tenant farmer being put in possession of a farm by a lease for a long definite period will of itself (providing he be an energetic good manager) be sufficient to make him feel an interest in the management and improvement of that farm, far beyond what he could feel were he a tenant at will, even supposing him to be protected from undue loss by tenants' rights. On the one hand (I mean in the case of a lease) a tenant will feel a perfect security of tenure, and rest satisfied that whatever extra exertion he may use, and whatever capital he may expend in improvements, he has a fair prospect of receiving a full and profitable return for his outlay by increased produce; whilst, on the other hand, when farming under a yearly tenancy, although he may be protected by tenants' rights from undue loss, yet he cannot, in nine cases out of ten, I presume, make up his mind to go on with that degree of spirit in extra cultivation and improvements that he otherwise would have done had he farmed under a lease; for although under ordinary circumstances he might feel satisfied that his landlord would not disturb him if he did his duty as a tenant, yet there are many things which might arise that might suddenly terminate the tenancy; as for instance, the estate might fall into other hands, or the landlord might wish to make some alterations in his farms, and in order to do that it might be requisite to discharge his tenants, or numerous other circumstances might arise which might lead to the same result. Now under those circumstances, it is true, he might have a guarantee that he should lose little or nothing by an extra expenditure of capital and labour in case of his being compelled to leave the farm before he had an opportunity of receiving remuneration for his outlay, for in such a case he might have his outlay reimbursed; yet he must feel a considerable degree of disappointment in not being permitted to reap the profits that would be likely to result from his extra exertion and outlay. Now, gentlemen, I have given an outline of my own views on this subject; but of course it is not my wish to cripple yours, but to have the matter fairly discussed.

Mr. **Walton**, after speaking of the desirableness of an enactment, or some other method or system for giving landlord and tenant greater security, and placing them in a position equally beneficial to both parties, said that the great difference which must necessarily exist in the cultivation and tenure of land in various parts of the United Kingdom would operate as one of the chief and most obvious difficulties in the formation of such an enactment; in fact, he thought this was an obstacle which would require the greatest research, care, and ingenuity to surmount. He thought that long leases were not actually requisite to ensure a profitable cultivation in which the interests of landlord and tenant might and ought to be mutual, but he thought that protection to the tenant farmer for extra outlay of capital in improved cultivation was indispensable; for it could not be expected that a tenant would be at any extra outlay unless he were satisfied that he should have time to reap the profits of his outlay; or otherwise, in the case of having to quit his farm before he had an opportunity of doing that, then he must of course be reimbursed for his unexhausted improvements. But this could be arranged by tenants' rights judiciously framed. He thought that in framing tenants' rights it was desirable for the entering tenant to buy the quitting tenant's away-going crops of corn—a certain time being allowed for payment; but the straw in all cases ought to belong to the entering tenant. It was also a good plan, and one that he knew to work well for both parties, for the landlord to advance the requisite capital for draining, and have it done under his directions, the tenant leading the tiles and paying 5 per cent. on the capital so expended by the landlord. Or in cases where it was not convenient for the landlord to advance the requisite amount of capital for draining, the tenant having it in his power to do so, then he ought to be at liberty to drain under the direction of his landlord, and have the money he expended guaranteed to be returned to him on his quitting the farm.

Mr. **Trotter** thought that leases were not requisite, nor did he see how a tenant farmer could, in the face of free trade, take a lease at all at present; and therefore he thought that such an agreement from year to year as would give confidence, and insure the rights of both landlord and tenant, would be preferable to a lease.

Mr. **Mears** thought, that any difficulties with regard to present prospects might be met by basing the lease on the corn-rent principle; and he thought that, to insure an improved state of cultivation, a long lease would be an advantage.

Mr. **Dixon**, the Secretary, said that there were other objections to a yearly tenancy besides what he had mentioned at the opening; and one of these objections was, that a yearly tenancy places an indolent and slovenly farmer on pretty near an equal footing with a good manager; because a bad manager can go and take a farm which is in a pretty good state of cultivation at the time he enters upon it, and will be able to pay as much rent for two or three years as a good farmer; but then the slovenly farmer has to leave the farm at the end of that time entirely out of condition, in consequence of which the landlord probably has then to let it at a reduced rent, in order to get it put into a proper state of cultivation again: not so with the managing farmer; for he, on taking a farm, would continue to cultivate it properly, and would leave it in as good a state of cultivation as it was when he entered upon it, or perhaps even better. He believed that, if leases were once established, it would be the means of placing the good cultivator and the slovenly farmer in their true position with regard to each other and to their landlords. If leases were established, a bad farmer could not in the same way take advantage of both the farm and his landlord, for he then must look forward to a number of years, and calculate accordingly; and in taking a lease with the covenants therein judiciously framed, he must either comply with those covenants, or in failing to do so he must fall into disgrace and lose his character as a good farmer. He did not think that the meeting could then come to any definite resolutions as to what kind of covenants ought to be inserted in an agreement or a lease between landlord and tenant; but probably, after hearing the opinions of this meeting, it would be a better course to reconsider the subject at a future meeting, or to appoint a special committee to reconsider the matter, and bring their matured ideas before some future meeting of the Club. He also observed that there were some very valuable suggestions for improved agreements between landlord and tenant, which were adopted by the Loughborough Agricultural Society, and published in the sixth volume of the Royal Agricultural Society's Journal, and which he then read to the meeting. Mr. Chapman, Mr. Byers, Mr. William Dixon, and several other members advocated leases of fourteen years or upwards, based upon corn-rents or otherwise, in preference to yearly tenancies.

Mr. H. **Pease** said that though he was not a practical man in agriculture, yet he was as anxious as any one for its welfare and improvement. He thought, from the little knowledge he possessed of the subject, and from the numerous remarks he had heard during the discussion from practical farmers and men well versed in agricultural pursuits, that yearly tenancies were disadvantageous, and more particularly for this reason, that a tenant at will would do nothing more than what was conducive to his immediate advantage; which conduct, by the bye, was scarcely blameable, he having seldom any certainty of reaping the full advantage from extra outlay. He, therefore, during the course of the discussion, had drawn up a resolution or two, which seemed to him to coincide with the majority of the remarks which he had heard, and which he would now beg to submit to the meeting. He then read the following :—

"Resolved, That the customary arrangements between landlord and tenant are capable of great improvement.

"That a yearly tenancy is more especially disadvantageous to both parties :—1st, Because the tenant will be likely to evade as far as possible the best system of husbandry, if it in any way interfere with his immediate profits; 2nd, Because he cannot be expected to invest the amount of capital needful for the best cultivation of the land; 3rd, Because the landlord is not likely to obtain tenants of the same capital and talent.

"That for these reasons the Darlington Farmers' Club are of opinion that a lease ranging from fourteen to twenty-one years ought to be adopted as far as possible.

"That in the absence of a lease, an agreement for the mutual protection of both landlord and tenant is most desirable."

The above resolutions were then put to the meeting and carried unanimously. It was afterwards unanimously resolved,

"That a special committee, consisting of the members of the present committee of the club, with power to add to their number, be now deputed to arrange a form of agreement or lease more to the advantage of both landlord and tenant than those generally in existence, and to lay the same before a future meeting of the club."

PORK TRADE AND PORK PACKING IN THE WEST.

As there has been of late an unusual interest excited throughout the country in regard to the hog-slaughtering and pork-packing of the Great West, we give below a comparative statement of the business of the three last years, derived from a correspondent of the "Philadelphia Commercial List." The writer alluded to took considerable trouble to ascertain the actual numbers cut and packed at different points, and in the table below gives the correct number of hogs cut and packed at fifty-three different towns. The hogs this season, in consequence of the farmers urging, or rather, forcing the thing much more than usual, to get their hogs into market (to obtain the high prices), will average full 15-lbs. per hog lighter, throughout the country, than last season. This, on 800,000 hogs (the supposed number generally packed throughout the West), at an average of 225 lbs. per hog, would deduct from the excess 55,333 hogs. On the 1st day of December, 1844, as far as can be ascertained, there were fully 125,000 bbls. of old pork in the United States, over the amount on hand at a similar date in 1845; say 50,000 bbls. in New York, 40,000 bbls. in all the other Eastern cities, and 35,000 bbls. at New Orleans and all the different points throughout the West. This, with the excess of old lard and bacon at that time, would be fully equal to 300,000 hogs.

	1843-4.	1844-5.	1845-6.
Cincinnati, Ohio . . .	250,000	200,000	270,000
Circleville	42,000	12,000	16,000
Columbus	14,000	8,000	10,000
Chillicothe	52,000	24,000	40,000
Portsmouth	2,000	800	1,500
Winchester	1,200	800	
Eaton	3,800	700	1,000
Piqua	5,000	1,500	2,600
Franklin	3,500	2,800	3,000
Dayton	20,000	12,000	6,000
Middleton	10,000	7,500	7,500
Camden	8,000	7,000	8,000
Hamilton	40,000	35,000	35,000
Lebanon	5,000	4,000	4,000
Lancaster	2,500	1,100	1,300
Centerville	700	600	800
Greenville	2,500	1,000	600
New Paris	5,000	6,000	6,000
Xenia	5,000	1,500	200
Clarkesville	11,000	10,000	9,000
Leesburgh		500	
Miamesburgh	1,800	1,500	1,000
N. Burlington	2,400	1,700	2,000
Ripley	10,000	10,000	12,000
Springfield	6,000	5,000	1,000
Laurencebu'gh, Indiana	13,000	9,000	10,000
Laurel	8,000	7,000	4,000
Madison	45,000	50,000	50,000
Richmond	5,000	800	1,000
Centerville, Indiana		1,600	1,800
Brookville	8,500	6,000	7,000
Economy	800	400	300
Evansville	5,000	4,000	7,500
Louisville, Kentucky	68,000	50,000	100,000
Maysville	14,000	7,000	9,000
Bowling Green	8,000	7,000	8,500
Frankfort	11,000	10,000	4,500
Alton, Illinois	10,000	16,000	18,000
St. Louis, Missouri .	16,000	13,000	17,000
Hannibal	20,000	16,000	18,000
La Groo	3,000		1,000
Independence	600		500
Fort Wayne	3,000	800	2,000
Williamsport	4,500	2,000	2,400
Newport	3,500	1,200	200
Vincennes	6,000	3,000	5,000
Attica	2,700	1,700	3,500
Montezuma	7,000	1,000	1,000
Terre Haute	27,000	18,000	20,000
Delphi	7,000	2,000	6,000
Cramfordsville	7,000		5,000
Troy	4,000	1,000	2,000
La Fayette	25,000	15,000	15,000
	856,000	593,500	758,100
			593,500
			164,600

Showing the whole matter to stand thus:

Old pork on hand last year equal to		300,000
Excess in the number of head of hogs cut in the fifty-three towns above-named (including all the most important points), this year over last	164,600	
Deduct for light weight, as per above	55,333	
		109,267
Total		190,733

Thus it will be seen very plainly that there must be an excess of full 190,733 head of hogs cut.

It is stated in "Peabody's Weekly Markets" of Feb. 20th, 1846, that the number packed at Cincinnati during the last season has been largely augmented by a change of the direction of the hogs from Southern Kentucky, a large proportion of which were driven to the Ohio river this season, on account of the scarcity of corn on the Southern route beyond the Cumberland gap. Last year Cincinnati received from Kentucky about 45,000 head, and this year about 140,000, making the receipts of live hogs from other sources (Ohio and Indiana) actually less this season than last.

[From "Freeman Hunt's Commercial Review."]

CALENDAR OF HORTICULTURE.—JULY.

Retrospect.—On the present occasion this promises to form the most interesting portion of the article; for the weather is so lovely, yet extraordinary, if not anomalous, as to merit particular attention. They who have noticed the various meteorological tables which have been published in *The Farmer's Magazine*, and horticultural weekly newspapers, must have remarked the equability of temperature that, as a whole, prevailed the whole winter, and during the greater part of the spring. Yet there was one exception, which shall be duly mentioned in its place. In January there were *eleven* days on which it rained more or less; in February, *ten* days, and *two* with snow; in March, *thirteen*, with, twice, a little hail. Thus we enumerate thirty-six days in the three first months of the year, wherein moisture was added to the soil, already supplied by the rains of November and December. The drying and sunny season of the second and third weeks of March tended, however, to maintain a due balance; but at the most important period of the whole—between the 17th and

21st—with a brilliant atmosphere, occurred the only visitation of keen frost which was worthy of notice; for by it the bloom of all forward trees—apricot, pear, and peach—then fully expanded—was perilled, and, in too many instances, rendered abortive. As to apricots we have not seen one, upon trees that usually are loaded with fruit.

April became thoroughly wet, having, as stated on various occasions, brought twenty-one days of copious rains, the other nine being gloomy, with little midday sun. May was a fine month, with a fair proportion of showers, on ten occasions within the three first weeks, and a gently progressing temperature; but, unfortunately, as in March, a fierce north-easterly current set in on the 14th and 15th, which produced all the effects of that violent and sudden heat that in June, 1845, did so much mischief to the spur-bearing fruit-trees. The plums were set; the apples seemed secure: but soon after this assault the trees were disfigured, plum-trees in particular; and many spurs and small branches of the apple were entirely killed. Thus, whether a winter be severe to the extreme, as in 1845, or mild almost beyond example, disasters may be brought about by meteoric disturbances of even only a few hours' duration.

On the 20th of May, after thunder and hail showers, the easterly winds of the season set in; but, so far from introducing cold weather, they established that high temperature and perfect splendour which continue to this hour, and are almost without traceable precedent.

By the quantity of rain which fell during winter and spring, one would have supposed that the land was prepared to support any degree of drought; but the present condition of the gardens clearly proves it to be otherwise. The soil, if at all binding, is hard, and cracked into fissures; and from the sudden effect produced upon strawberries, currant, gooseberry, and raspberry bushes, one would suppose that the store of moisture had become decomposed by electric agency, and carried off as gases—not as simple watery vapour. The fruit, where water in profusion is not at hand, is injured, and greatly reduced, and the leaves fall off as in September. Aphis and honey-dew have deformed the roses most frightfully; and flowers, though abundant, become bleached in a few hours. Different localities admit of variations; but, generally speaking, the brilliant glory of the atmosphere is adverse to the beauty of the flower-garden; and unless fruit-trees be carefully watered, and then deeply mulched, the little which remains will be unable to attain any size or flavour.

One circumstance in proof of the extreme mildness of the winter must be noticed. The hardier *fuchsias*, that stand in the open ground all the year, have now the *old wood* full of verdant and blooming shoots. This is the first season during sixteen years wherein the circumstance has been witnessed.

It is a duty to state that we perceive not one sign of disease in the potato, whether sown or self-produced from tubers not digged. If rain keep off, the crop must be small; and even now, many potatoes under half-an-ounce in weight are pushing shoots. But, as to disease, let the reader attend to the following facts, which can be attested. Seven rows of *diseased* tubers, with some sound eyes, whole or cut, but all coated with lime-dust, were planted in November. A few failed to vegetate, and, no doubt, rotted in the ground. By far the greater number grew, but not early, and now are in full bloom, healthy as possible. Four diseased, small potatoes had been preserved all winter, because they had protruded minute tubers around the base of starting eyes. They were wrapped in paper, laid aside, and forgotten till April. The old tubers had nearly dried up; but the small progeny was sound. One half-potato, with two or three little ones attached to it, scarcely larger than peas, was otherwise quite dry and *effœte;* and one little tuber, not larger than a horsebean, was detached These were set, and marked with tallies. The decayed half-tuber was digged up May 18th. It had produced forty potatoes fit for table: the old half perfectly rotten, but retaining its skin and form. Three small, healthy tubers were produced by another. A fine growing plant from the third, which, when set, was not larger than a horsebean, had germs of new potatoes, but none fit for use; and the fourth had vanished, or failed to grow. Thus, so far as experience warrants the conclusion, disease does not exist *here* in any kind of potato, however planted or however grown.

Another phenomenon must be recorded. The plum and pear-trees particularly, which had lost crop by the frost of March, or by the wind of May, are protruding a copious secondary bloom, in complete tufts, and with this a precocious series of what are called "July shoots." The former may come to nothing, but it is very remarkable. A pear-tree of the fine variety—*Beurré d'Aremberg*, has now on it several healthy pears of the spring crop, and, till it was summer-pruned of very rampant shoots on the 17th, exhibited ten or twelve perfect corymbs of new blooms. The occurrence of bloom is by no means rare at the present season.

VEGETABLE GARDEN.

We cannot doubt that rain must fall in July, because that month is our rainy season: if it do, the land will be in a better state, and may receive one more sowing of peas, runner, and dwarf kidney beans, a few carrots, and onions to draw young. But if drought continue, surface watering will do little: the ground must be soaked, and shaded all day, watering on three successive evenings. Seeds of any kind will then grow, provided the spot be still kept moist, and be shaded till they germinate and attain the true leaves.

Turnips.—A full crop in drills, over manure, are sown during the month, as are cabbage-seeds for raising winter colewort-greens.

Celery, already planted out, should be frequently watered in dry weather; and a second early row or two must be put in trenches.

Plant out May-sown *cauliflowers.* This plant never does so well as in the alleys. Also plant out *asparagus* in single rows, which are filled with dung, and that covered with a few inches of mould. This method of planting asparagus is comparatively new, and must be described in due season.

Small salads and large *turnip-radish* are now sown, and a little *endive* at the close of the month: also a sprinkling of *lettuce.*

Artichokes bear plentifully; but the drought affects them much. It would be well to mulch the beds, and those of asparagus now, to keep in moisture, and to be ready against a fall of rain.

Cucumbers, over dung, shaded for a time, will soon bear abundantly in the open air.

Leeks are to be transplanted into rich ground, six inches apart.

Gather and dry sweet and medicinal *herbs.*

Clear the ground of litter; pull up sticks and pea-haulm; earth up *peas,* and dig where wanted. In so doing, lay plenty of moist manure over the surface, dig or trench it in; work and break the surface, even and small as possible; then tread it over, rake off the stones, and roll it with a light iron roller: true drills can then be made, and may be watered before planting. These directions apply strictly to a dry season.

Ground so prepared may receive *broccoli* for winter, the holes being filled with water. It will also be ready for *winter spinach.*

Fruit Department.

Train in all the next year's wood of *stone-fruit trees,* wash the plants by an engine, and mulch over the surface.

Do not shorten any shoots now, but cut clean away ill-placed and superfluous wood, nailing in all that it is intended to train, for next year's bearing.

Vines require frequent care to retain an abundant covering of leaves for the fruit, but to clear away all tendrils, wandering, weak, and useless wood.

Prepare to destroy wasps and large flies, by suspending bottles, three parts full of treacle and water. Snails and earwigs are desperate enemies to *wall-fruit.* Lime may retard the former; but the latter require inverted pots, with hay at bottom, set upon sticks, as is done by dahlia growers.

Bud *fruit trees.* Choose a cool and moist evening.

In the forcing-houses, *pines* ripen rapidly, and require air.

Vines are in full fruit. Admit air, but shade well, and have a series of some light fabric drawn across top-lights that are opened, to prevent the ingress of wasps and large flies.

Garden and Shrubbery.

Perform every operation in time, that is consistent with order and neatness; Dutch-hoe the surface of beds; remove stones; tie up tall growers; remove old flower-stems; fill the plots (but orderly and in regular figure) with green-house and frame plants. Sweep, mow, and roll lawns and walks.

Propagate *pinks* by pipings, and *carnations* by layers. The soil required is rich, very sandy loam, and some finely screened chalk. Lay cinders and ashes at bottom, a foot below the soil; upon that a good stratum of fine earth; make it moist and very firm; plant the pipings a full joint deep; sprinkle, and when dry, press down the hand-light so as to exclude air.

Bud *roses* in the evening, seeing that the bark of scion and stock separate freely, and show a moist surface of wood beneath. A skilful and adroit manipulator will seldom fail.

The heat while we close this article has stood at from 85° to 88°; a brilliant day, after a strong haze, which promised to collect into thunder clouds; but the whole dispersed, and vanished by 10 A.M.

Maidenhead Thicket, June 19.

ANSWERS TO AGRICULTURAL QUERIES.

Sir,—In reply to "Inquirer," in your last, I would, from experience, recommend to him "Low on Landed Property," and "Practical Farming," by C. Hillyard. Having myself received several valuable hints from your correspondents, I endeavour now to make a tithe of the return due from me.

Yours respectfully,

Cambridge, May 16. Bursarius.

Sir,—In the *Mark Lane Express,* of the 11th inst., there appears a letter from a "Lincolnshire Farmer" inquiring the "most effectual and cheapest way of destroying hemlock plants." Having had a meadow infested with them myself, I was long at a loss how to get rid of them; I at last hit upon a plan which completely destroyed them. It was in the latter part of May, two years ago, the hemlock plants had got very strong at the root; I set two women, with common turnip hoes, very sharp, and they cut every plant close off by the surface; each had a quantity of salt in her apron, and as soon as they cut the plants, they took as much salt as they could hold with their fingers, and laid it upon every plant they cut; the result was every one was killed, and I have not been troubled with any since.

I remain, your most obedient servant,

A Northumberland Farmer.

METEOROLOGICAL DIARY.

Barometer.			Thermometer.			Wind and State.		Atmosphere.		
Day.	8 a.m.	10p.m.	Min.	Max.	10p.m.	Direction.	Force.	8 a.m.	2 p. m.	10 p. m.
	in. cts.	in. cts.								
May 21	29.64	29.98	41	68	49	E. by North	gentle	cloudy	sun	fine
22	30.10	30.20	47	76	53	E., N. W.	gentle	fine	sun	fine
23	30.20	30.22	49	71	57	Northerly	gentle	cloudy	sun	fine
24	30.22	30.23	49	78	56	Northerly	gentle	fine	sun	fine
25	30.23	30.18	47	72	60	N. by West	lively	fine	sun	cloudy
26	30.16	30.16	49	70	51	N. by West	gentle	fine	sun	fine
27	30.16	30.16	42	76	58	North	lively	fine	sun	cloudy
28	30.16	30.08	44	70	50	N. East	lively	fine	sun	fine
29	30.30	30.27	42	76	50	N., S., N. W.	gentle	fine	sun	fine
30	30.31	30.30	41	78	58	Northerly	gentle	fine	sun	fine
31	30.23	30.26	46	80	61	N., East	gentle	fine	sun	fine
June 1	30.20	30.21	50	72	58	N. East	lively	fine	sun	fine
2	30.23	30.23	48	78	58	East	gentle	fine	sun	fine
3	30.23	30.23	44	80	60	E. by North	gentle	fine	sun	fine
4	30.24	30.20	52	81	61	E. by North	gentle	fine	sun	fine
5	30.20	30.20	55	81	62	E. by North	lively	fine	sun	fine
6	30.16	30.08	51	92	64	Various	gentle	fine	sun	fine
7	30.08	29.98	54	92	67	S. E. to West	lively	fine	sun	cloudy
8	29.98	29.88	56	80	56	N. West	gentle	fine	sun	fine
9	29.88	28.88	50	78	54	Westerly	gentle	fine	cloudy	fine
10	29.93	30.03	55	76	62	W. by North	gentle	cloudy	cloudy	cloudy
11	30.18	30.24	61	82	62	N. West	lively	fine	sun	fine
12	30.23	30.24	59	82	59	N. by West	lively	fine	sun	fine
13	30.22	30.13	58	84	59	East	lively	fine	sun	fine
14	30.14	30.14	58	83	58	East	lively	fine	sun	fine
15	30.18	30.27	57	85	60	East	gentle	fine	sun	cloudy
16	30.33	30.35	59	88	61	East	variable	fine	sun	fine
17	30.36	30.30	58	83	60	East	lively	fine	sun	fine
18	30.27	30.20	57	85	58	East	lively	fine	sun	fine
19	30.20	30.10	55	86	63	E.,W.,W.byN.	lively	haze	sun	fine
20	30.10	30.23	60	84	63	N. N. E.	gusty	fine	sun	fine

ESTIMATED AVERAGES OF JUNE.

Barometer.		Thermometer.		
High.	Low.	High.	Low.	Mean.
39.460	29.600	90	37	58.7

REAL AVERAGE TEMPERATURE OF THE PERIOD.

High.	Low.	Mean.
79.55	51.225	65.387

North and N. East Winds...	11½ days.
East and to South..........	6
South and South West.......	0½
West and to North..........	13

Weather and Phenomena.

May 21, becoming fine. 22, Great heat, clear. 23, Cloudy, and the last rain in May: fine day. 24, Red sunset. 25 to 31, Confirmed drought, only a few cumuli on one or two evenings.

Lunation of May.—New moon, 25th, 4 h. 44 m. morning.

June 1, Hazy a few hours, then brilliant. 3, 4, 5, Above summer heat. 6, 7, Oppressive, cloudy in the latter evening, cooler, and hint of rain. 8, Sweetly fresh: thunder in the west had cleared the air, 9, Hint of rain, 60, The slight disturbance of the few last days now passed away. 11 to 15, Almost cloudless; the fresh air during day generally subsided at sunset. 16, 17, 18, Very hot. 19, Misty haze from sunrise to 9 A.M.; then a perfect clearing. 20, Brisk, gusty wind, driving dust along the roads; hot sun, hazy above.

Lunations.—First quarter, June 2nd, 5 h. 30 m. morning; full moon, 9th day, 3 h. 36 m. afternoon; last quarter, 16th day, 6 h. 38 m. morning.

Remarks referring to agriculture.

The chief phenomena are, the unusual heat, mild temperature and regularity of the nights, extraordinary even range of the barometer, excepting at the slight disturbance of the atmosphere between the 6th and the 10th of June. Our columns will prove *the gorgeous beauty of the weather;* and with such a blaze of sun, what other could be the condition of the wheat than that in which we find it?—fairly tall, fine in ear (the first seen on the 1st of June), regularly in flower, and with no blanks or patches. Rain is wanted for oats, barley, clover, meadow, and above all, for turnips. The hay crop of all kinds has been rich to profusion.

Maidenhead Thicket. John Towers.

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR JUNE.

From the commencement until the 22nd of the month, the weather in all parts of the United Kingdom continued unusually hot, with a temperature frequently above 80 degrees. During the whole of the above period, scarcely a drop of rain fell in any quarter: the consequence was, that well-grounded apprehensions were entertained that the crops of all descriptions of Lent corn would be considerably under an average. However, these fears were much dispelled towards the latter end of the month, when we were visited with some refreshing showers, which, though they lodged considerable breadths of corn, have had a most beneficial effect upon spring corn in general, which is now rapidly recovering from the effects of drought. As to the wheats, it is gratifying to observe that the reports which have come to hand are of a most favourable character. On the heavy as well as the light lands, they have bloomed well, and present every indication of a good return. Considerable activity has been displayed in preparing the land for turnips, the sowing of which progressed somewhat slowly up to quite the 21st: consequently some time must yet elapse ere the whole of the seed can be sown. In some of the forward districts it has come up very regularly; but in many parts, from want of moisture, the plant is by no means thick. Hay-making, especially in the neighbourhood of the metropolis, has progressed with remarkable activity, nearly the whole of the crop being secured in excellent condition prior to the late falls of rain. In the northern as well as the midland counties, very good progress has been made, and a week or ten days of fine weather would enable the farmers to finish stacking. Notwithstanding the pasture-land has been suffering somewhat from the want of moisture, live-stock has fared extremely well. Some complaints of losses sustained by the epidemic have reached us. The supplies of both beasts and sheep forwarded to our various markets have been in most excellent condition, and of quality seldom or never surpassed at this season of the year. We have now arrived at the conclusion of a most bountiful fall of lambs, and we have every reason to believe that the number has considerably exceeded that of many former years: hence, to keep down prices, it is quite evident that we do not stand in need of foreign importations, whatever may be urged by those who have given their support to the measure proposed by the minister.

From the most extensive inquiries we have lately instituted, we find that the stocks of grain of last year's produce are seasonably extensive, and, we may add, quite equal to meet the wants of the consumers till quite the close of harvest operations. This, in the present position of political affairs affecting the interests of our agriculturists, is a great fact, and, as such, deserves to be recorded, as showing the fallacy of legislating upon so important a matter as is the future value of grain in this country. We have all along felt it our duty to oppose the famine-cry raised by the free-trade party, from the honest conviction that we are in a position to do without the foreign producers altogether. Such being the fact (and who is in a position to disprove our assertion?) why, we ask, are we to be called upon to subscribe to statements which have no foundation in truth? Our readers will bear us out in the observation that we are now on the eve of one of the most abundant wheat harvests ever produced in this country; that the stocks of old wheat are good; and yet we are told that the admission of 2,500,000 quarters of foreign grain and flour will have very little effect upon the value of home produce. We admit that our millers and others have long been, and still are, deficient in stock; yet we entertain very great doubts that, were their wants adequately supplied, the whole of the above quantity can be taken by them, and thus give the English growers even a fair chance of realizing that amount of profit to which they are justly entitled. We regard, therefore, the change in the corn laws as fraught with the utmost danger to the agricultural community, consequently it has our most strenuous opposition.

In the early part of the month the different corn markets were moderately supplied with each kind of grain, the demand for which ruled steady at very full prices. The continuance of dry weather, and the limited arrivals, produced steady markets during its latter portion, and the general quotations advanced from 2s. to 3s. per qr. It is, however, scarcely probable that, when the new law has fairly come into operation, present prices can be maintained.

Respecting the appearance of the growing crops, our advices from Ireland and Scotland are favourable. The corn trade has ruled firm, and prices have had an upward tendency. The shipments of grain to the English markets have been very trifling for some time past.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

In reviewing the state of the cattle trade in the metropolis, as well as our provincial districts, during the month just concluded, it is gratifying for us to be enabled to observe that a very marked improvement, both in the condition and quality of the stock brought forward for sale, has been apparent (indeed, we scarcely ever recollect to have witnessed such splendid exhibitions of both beasts and sheep at any previous corresponding periods of the year as we have noticed of late) in all parts of the United Kingdom; and, further, that, notwithstanding some farmers have sustained severe losses, the ravages of the long-complained-of epidemic have been, comparatively speaking, of trifling importance. The unusually warm weather, though it has somewhat lessened the supply of pasture herbage, has, no doubt, greatly contributed to keep the cattle in good heart; neither the beasts nor sheep having had to contend with superabundant moisture in any part of the country.

It will be recollected that, notwithstanding assertions to the contrary, we have all along contended that the general available supply of stock in this country has been good, and fully adequate to meet the wants of the consumers without the aid of foreign importations. The deficiency which existed in some of our grazing districts in the early part of last year—the result, chiefly, of large droves having been purchased by the northern jobbers and graziers—is now no longer complained of; and, as we have had an unusually good lambing season, we have every reason to believe that the prices of mutton will shortly experience a decline, more especially should the arrivals from abroad continue to increase (which they unquestionably will) under the influence of free—or rather "foul"—trade. It is not our intention, on the present occasion, to enter into any lengthened details to prove the utter fallacy, unsoundness, nay, the injustice of the scheme propounded by Sir Robert Peel; but when we see the great exertions making by the Dutch and German graziers to supply our markets with almost unlimited supplies of stock, and when we KNOW that those produced here are quite equal to our wants, we arrive at the conclusion that the present measure is wholly uncalled-for and unnecessary. We have been told that little or no increase would take place in the importations while a duty was imposed; but is it to be supposed for one moment that while good prices can be realized here, the foreigners will not continue to supply us liberally? This has been exactly the case this year, or at least a portion of it; and its effects are fully shown by the annexed comparison of the imports during the first four months of the present and two past years, ending on the 5th of May in each year:—

	1844.	1845.	1846.
Oxen . .	202	1151	2371
Cows . .	84	600	3077
Calves . .	5	13	103
Sheep . .	57	865	8947
Lambs . .	1	1	27
Pigs . .	57	161	216
Totals	406	2791	14741

What stronger proof could we offer of the effects that must follow a free trade? Respecting foreign stock, we find that many parties have been led away with the notion that it never can be made equal, either in point of symmetry or weight, with our own; but are they aware that our short-horned beasts were originally imported from Holland, and since improved by crossing? Who that has seen the Prussian stock lately exhibited in Smithfield Market, but will not admit that they possess points quite equal to many of our own breeds? True, most of them have long legs; yet they very much resemble our Herefords and Devons in the make of their loins and forequarters—characteristics of no mean importance. But is it not possible so to improve the foreign beasts and sheep as to make them nearly, or quite, equal to our own? Undoubtedly it is: and what greater proof could we offer of the efforts in this particular than in stating the important fact, that during the past month large numbers of our very best breeds have been shipped to Hamburg and Rotterdam for that purpose? Since the date of our last report, the annexed supplies have been received in London:—

	HEAD.
Beasts	791
Sheep	2500
Lambs	411
Calves	32
Pigs	110
Total.........	3,844

In addition to the above, about 500 head of beasts and sheep have been landed at Hull, chiefly from Rotterdam.

The supplies of both beasts and sheep on offer in Smithfield cattle market have been considerably on the increase. The beef trade has, in consequence, ruled dull, at a decline in the quotations of from 2d. to 4d. per 8 lbs.; while the value of lamb and veal has fallen to the same extent. In mutton, however, a steady business has been transacted at about stationary prices. The following are the numbers exhibited :

	HEAD.
Beasts	15,284
Cows	689
Sheep and lambs	163,080
Calves	3,021
Pigs	2,580
Total	184,654

At the same time in 1843, 1844, and 1845, the annexed supplies were brought forward :—

	1843.	1844.	1845.
Beasts	11,980	13,290	13,476
Sheep and lambs	159,400	169,800	131,390
Calves	2,200	1,840	2,212
Pigs	2,800	2,600	2,345
Totals	176,380	187,530	149,423

Hence it will be seen that the numbers in the past month have nearly equalled those of one of the most extensive on record, viz. June, 1844.

The bullock droves, in the past month, have been derived as under :—

	HEAD.
Norfolk, &c.	7700
Western and Midland Counties	2600
Northern dictricts	800
Other parts of England	1030
Scotland	995

The remainder being chiefly derived from the neighbourhood of the metropolis.

As to prices, they have, as we have before marked, had a downward tendency, and the following may be taken as the average :—

Per 8lbs., to sink the offal.

	s.	d.		s.	d.
Beef	2	4	to	3	10
Mutton	2	8		4	4
Lamb	5	0		6	2
Veal	3	6		4	6
Pork	3	4		4	10

The various markets held in the provincial districts have exhibited increased supplies of stock, which have moved off slowly on easier terms.

Up to Newgate and Leadenhall markets the arrivals of slaughtered meat have been seasonably extensive. Generally speaking, the demand has ruled heavy. Beef has sold at from 2s. 4d. to 3s. 6d.; mutton, 3s. 2d. to 4s.; lamb, 5s. to 6s.; veal, 3s. 4d. to 4s. 4d.; and pork, 3s. 4d. to 5s. per 8lbs. by the carcass.

ARRIVAL OF CARCASSES DURING THE MONTH.

	Beasts.	Sheep.	Calves.	Pigs.
Scotland	57	450	—	410
Yorkshire	80	700	—	520
Lincolnshire	90	380	—	280
Norfolk	103	270	—	230
Suffolk	82	310	—	170
Cambridgeshire	100	240	—	270
Essex	60	155	140	260
Surrey	76	250	180	110
Devonshire	—	—	—	120
Wiltshire	110	240	180	140
Other parts	150	400	300	220

AGRICULTURAL INTELLIGENCE, FAIRS, &c.

TRINITY MUIR FAIR.—Dealing went on slowly on account of the high rates demanded by the sellers, but ultimately parties came to terms, and much business was done. Prices were not so high as at some of the recent fairs in the neighbourhood, and large numbers of sheep remained unsold ; but the rates were considered remunerating by the breeder and feeder. Black-faced old ewes and lambs brought from 16*l.* to 22*l.* ; three-year-old wedders do. from 17*l.* to 24*l.* per score ; best fat from 5½d. to 6d. per lb. sinking the offals. Mr. Robertson, Westside, sold a lot of very fine crosses (out of the wool) at 30*l.* ; and Mr. Welsh, Tillytoghills, a lot of two-year-old Cheviots at 32*l.* per score. There was a very fine show of cattle in the market yesterday, and although sales were rather stiff, much business was done. There was a fine display of fat beasts, which brought about 7s. per Dutch stone, to sink the offals ; and the market was nearly cleared of all the best animals, but a large number of half-bred and drove beasts remained unsold at a late hour. The best three-year-old stots in the market were sold by Mr. Mustard, Lenchland, at 21*l.* ; and Captain Hawkins, Cairnbank, sold a lot of fine two-year-olds at 14*l.* 10s. The north country cattle were difficult to sell at the rates demanded, but the best lots exchanged owners before the close of the day. The north country cattle brought from 9*l.* to 12*l.* 10s., according to weight and quality. Messrs. Fawns sold about six scores of this description, which were among the best in the market. Small farrow cows or queys for grass brought from 7*l.* to 9*l.* per head, or about 5s. 6d. to 6s. per Dutch stone of their estimated weight when fat. The market was much fuller of fat cattle than for several years past ; and, considering the immense sums paid for this sort of stock, it may be questioned when more passed through different hands. There are a good number of horses in the neighbourhood for this day's market, for which sellers are demanding high prices.

STOFFORD FAIR.—There was a tolerably good supply of beasts, and many were in excellent condition ; the sale was by no means brisk, and prices were considered to have declined, averaging from 1s. 6d. to 9s. 6d. per score. Some prime animals fetched a trifle beyond the latter price. The sale of store animals was very flat, and many were driven away unsold. There was an average supply of sheep, but the sales ruled flat throughout the day, and a reduction of the late prices was ultimately submitted to by the sellers before many purchases could be effected. Lambs sold from 18s. to 24s. each, according to quality; hogs, 32s. to 38s.; and good fat sheep from 40s. to 45s. The general range of mutton was from 5½d. to 6½d. per lb. The horse fair presented no particular feature; very few good horses were offered for sale—the prices were by no means sustained. One good cart-horse was sold for 30*l*., and many others fetched remunerating prices. The pig fair was very dull, and a considerable reduction was made in the price of all animals of this class. The wool-staplers were on the look-out, and somewhat numerous, but they appeared shy, and very reluctant to purchase, excepting on reduced terms. A good quantity of the new clip was sold at prices varying from 11½d. to 12½d. per lb., and some good tegs produced 1s. 1d. per lb.; but the latter price was by no means general.

DREWSTEIGNTON FAIR was a good one, the supply being much about the accustomed quantity, and fat bullocks fetched from 9s. to 9s. 6d. per score. Fat sheep (shorn), from 5d. to 6d. per lb.; lambs, from 5½d. to above 6d. per lb. There was a splendid show of cows and calves, four heifers from one farm being particularly noticed. For another also that was greatly admired, it was understood 18*l*. was asked for the heifer and calf; but the whole of these were turned out unsold. The highest price heard of, at which a sale in this respect was effected, being 14*l*. 10s.

HENLEY FAIR.—There was a limited supply of cattle and sheep. Good horses and cows were in demand, and obtained about the prices of previous fairs. The trade in sheep was considered dull, but not cheaper; there were scarcely any Down wethers offered for sale: useful couples obtained 47s.; lambs from 20s. to 25s.; and shorn ewe tegs to 23s. per head.

DROITWICH FAIR.—The attendance of buyers was great, and the lambs met with ready sale from 7½d. to 8d. per lb., and were more in request. Beef bought for 6d. to 6½d., and mutton 6d., the supply of the latter being limited.

DOWN ST. MARY FAIR.—There was a fair supply of stock, and a fair share of business was done, fat bullocks fetching from 9s. to 9s. 6d. per score. Fat sheep (shorn), from 5d. to 6d. per lb.; ditto in their wool, from 6d. to near 7d. per lb.: lambs, from 5½d. to about 6¾d. per lb. There was a fine show of cows and calves, for which high prices were asked, and in one instance a heifer and calf were sold for 16*l*. 6s.

CUPAR JUNE MARKET.—This market was better supplied with good fat than we have usually seen at this season of the year. Owing to the very warm weather, sales were rather duller, and prices may be considered lower. A good many sales were, however, made. Mr. Tod, of Hilton, sold some very handsome queys at nearly 17*l*. a head. Mr. Inglis of Colluthie sold four very superior three-year-old stots at upwards of 18*l*. a head. Mr. Christie, Rhynd, sold eight very fine three-year-olds at upwards of 19*l*. Sir George Campbell had some good cattle in the market. Mr. Pitcairn, of Pratis, had also eight very fine cattle. Mr. Yool, Dura Den, sold eighteen three-year-olds at fully 15*l*. a head.

BALLYBROOD FAIR (Ireland).—There was a good show of cattle, which were in fair demand. Cows sold from 11*l*. to 14*l*. and upwards; heifers, 10*l*. to 14*l*.; calves, 3*l*. to 5*l*. Sheep realized prices fully equal to the late markets. Bulls sold well, 10*l*. to 12*l*.

REVIEW OF THE CORN TRADE

DURING THE MONTH OF JUNE.

After upwards of four months' discussion on the Corn Importation Bill, the measure has been carried, and we are now about to enter upon a new era. To afford protection to its native production has so long been the policy of Great Britain, that the experiment of free trade about to be tried is naturally viewed by a large proportion of the industrial classes with extreme apprehension; but, however great our fears may be, there is now no remedy. Large majorities have decided, in both Houses of Parliament, that the system hitherto found conducive to the prosperity of the kingdom is to be abandoned, and another substituted, of which little or nothing can at present be known. We sincerely trust that the apprehensions reasonably entertained may prove groundless, and that the new order of things may prove less mischievous than anticipated.

Our feelings remain as strongly as ever opposed to the ministerial plan; but as the premier has succeeded, it would be useless to wage a war against that we have no power to avert: we shall, therefore, at once drop political considerations, and proceed with what, in fact, is more legitimately our province, viz.—the prospects of the grain trade, and a retrospect of the transactions of the month.

In connection with this branch of our subject, we must give the weather the first place. Rarely have we experienced a month of June so intensely hot as that now about to terminate. From the 21st of May to the 21st of June scarcely a drop of rain fell in any part of the kingdom; and during the whole of that period the thermometer stood unusually high. Until the first week in June the great heat and the want of moisture had no injurious effect on vegetation: indeed, the crops were generally much benefited; but since about the 10th of the month the appearance of spring-sown corn has changed for the worse; and even the wheat-plant—not easily affected by drought—has shown symptoms of suffering. Whether the partial showers which have fallen since the 21st inst. have come in time to remedy the damage sustained by the late-sown barley and oats is questionable; for beans and peas they were clearly too late, and it is certain that the yield of the two last-named articles must inevitably be deficient.

The prospects for the wheat harvest we are inclined to consider favourable, and cutting will probably commence at least a fortnight earlier than in ordinary seasons. In the southern counties, the plant was generally in bloom about the middle of June: there were no high winds to shake off the blossom, and it set uncommonly well; from which circumstance we feel inclined to predict that the quality of the new produce will be fine; but we do not feel so confident respecting the yield. That there will be a short quantity of straw is unquestionable; and in some localities it looks so thin on the ground that we almost fear the produce of grain must also be deficient, notwithstanding the length of the ears, and their clean and healthy aspect. Along the eastern coast, particularly in Lincolnshire and Cambridgeshire, where there is a deep alluvial soil, the produce is likely to be abundant in quantity, and of very superior quality; but the case will, we apprehend, be different on clay lands, as well as on hot, sandy soils. Still, taking the kingdom collectively, there is a prospect of at least an average crop of wheat. With so fair a promise for the future, and the certainty of a repeal of the corn laws of 1842, there has been very little inducement for farmers to hold back their wheat: indeed, all circumstances considered, the incentives to realize have been great: the mere fact of nearly a million and a half qrs. of wheat, besides a million barrels of flour being held in bond, with the certainty of this large quantity of foreign bread stuffs being thrown on the market, ought, in our opinion, to have shown the English grower the necessity of availing himself of the opportunity afforded by the reduced state of the stocks in the hands of the millers, to get rid of as much of his last year's wheat as he might be anxious to place. This is, we think, a reasonable view to take of the matter; and we can scarcely believe that it can have been viewed otherwise by the farmers. Still, the supplies brought forward by the growers during the month have been unusually small; and we therefore come to the conclusion that there is less wheat of home growth remaining in the country than many supposed. The supplies have been so extremely short that prices have actually advanced in the face of fine weather for the growing crop, and the prospect of the liberation of an enormous quantity of foreign wheat and flour at an almost nominal duty. The rise in the value of the article since the close of May cannot be estimated at less than 3s. per qr. We cannot, however, flatter ourselves that this rise is likely to be maintained if the harvest should really prove as propitious as appearances at present promise. We view the enhancement as purely the result of a particular combination of circumstances: firstly, the shortness of the deliveries from the farmers; secondly, the total exhaustion of stocks in the hands of millers and merchants; and lastly, the unwillingness of holders of foreign to enter any portion of their wheat at a high duty, with the prospect before them of being enabled to liberate the same at so low a rate as that proposed, and now carried by her Majesty's advisers. We cannot, therefore, help thinking that should our wheat harvest be secured in good order, the value of the article will rate ruinously low; and though we shall be well pleased to find that we have been mistaken in our views, we much fear the injurious effects of the alteration in the corn laws on the value of British agricultural productions will not be long in developing themselves.

In regard to spring corn, the mischief will not be so soon apparent, simply from this reason, that the drought which continued from the 20th of May to the 20th of June, whilst rather beneficial than otherwise to wheat, has done serious injury to barley, oats, beans, and peas. Neither have we any stocks of consequence of any of these articles under lock; nor is there much chance of large imports from abroad. The refreshing showers which have fallen during the last few days may perhaps, in a great measure, remedy the mischief done to the barley and oat crops by the previous parching heat; but for beans and peas the rain has, we believe, come too late.

In some of the northern counties, a portion of the hay was still abroad when the dry weather broke up; but in all the southern parts of the kingdom, the greater part was secured without a drop of rain; and around the metropolis the crop is heavy and of excellent quality.

Within the last week or two, efforts have been made by interested parties to revive the potato murrain cry; but after a careful examination in different parts of the country, we come to the conclusion that hitherto no symptoms of the disorder of last year have manifested themselves: at all events, we have been unable to discover any evidence of the disease. That the effects of the potato blight were greatly exaggerated both here and in Ireland last season is proved by the fact that old potatoes are still abundant; and we ought, consequently, to receive reports on this head with extreme caution.

The foregoing remarks contain all that it is necessary to say at present respecting the crops. So much still depends on the weather, that it would be folly to attempt anything like a prediction of the probable result of the harvest. Wheat certainly looks exceedingly well at present, and spring corn very indifferent; but rain might greatly improve the latter, whilst a too long continuance of the same would place the first-named crop in danger. The most singular circumstance in connection with the wheat trade has been the rise which has taken place in the value of the article. Nothing but absolute scarcity can account for this, when it is borne in mind that we are on the point of having so great a quantity of foreign thrown on the markets. Not the slightest inclination has been shown to purchase wheat on speculation; but the supplies of the article having fallen short of the quantity required for immediate consumption, prices have been forced up at a time and under circumstances when such an occurrence was least to be expected. The arrivals of wheat coastwise into London have been exceedingly small, having scarcely exceeded 3000 qrs. per week. In ordinary times this would have been less felt, as millers have generally sufficient stock on hand to carry them over a temporary shortness of supply; but, in expectation of a change in the corn laws, our manufacturers of flour commenced early in the year to work out of stock, and for months past have bought from hand to mouth. This was all very well so long as the weekly receipts continued equal to the weekly requirements; but when the former became inadequate to the latter, there was nothing to fall back upon; hence competition to secure the little brought forward for sale followed; and factors were not slow in seizing the opportunity to raise their pretensions. The most important rise was on Monday, the 15th, when the best fresh-thrashed samples sold at Mark Lane at prices 3s. to 4s. per qr. above those current on that day se'nnight. This advance has since been steadily supported, though the new scale of duties is expected to come into force immediately, when liberation of the foreign wheat in bond will, of course, do away with the cause of the rise, viz.—the temporary scarcity. How prices will then arrange themselves remains still to be seen. At this moment (26th inst.), there is still a difference of at least 10s. per qr. between the value of wheat in bond and similar qualities free, whereas the duty will at once be reduced now that the Corn Importation Bill has received the royal assent, from 18s. to 4s. The most probable inference is that the recent rise on English wheat will not be supported; for it is hardly to be supposed that the release of 600,000 qrs., the quantity under lock in London alone, can take place without producing some effect on quotations. There has been far less doing in bonded wheat than might have been expected. As an article of speculation it has been almost wholly neglected; and though several parcels (mostly Polish Odessa) have been taken during the month for shipment to Belgium, which has caused this description to advance 1s. to 2s. per qr., little or no rise has occurred in prices of Baltic qualities. The purchases of the latter have been confined to small lots, taken from time to time by the millers, to supply urgent wants; for moderately good Danzig wheat, 50s., and for Rostock 47s. per qr. have been paid, which, with the cost of the certificates for liberating the same (10s. to 11s. per qr.), has brought the price too high to induce buyers to take more than their pressing wants have rendered necessary.

The flour trade has remained in an extremely dull state throughout the month, owing firstly to the unwillingness which the bakers have naturally felt to go into stock until they have ascertained the effect which may be produced by the alteration in the law, and secondly, from an aversion to have much flour by them at a period of extreme heat, when it is so liable to go out of condition. The nominal top price of town-manufactured has been steady at 47s. per sack; and at one time Norfolk households were sold as low as 37s., but latterly the value of the latter has, in consequence of a falling off in the supply, rallied 1s. to 2s. per sack.

Flour in bond has, within the last fortnight, met with attention, and the best brands of United States have readily brought 25s. to 26s. per brl.—rates which were not obtainable in the beginning of the month. By the official return just published, it appears that there were on the 5th of June 234,162 cwts. of flour in London, and 1,298,683 cwts. in the United Kingdom under lock, whilst the imports have since then been considerable.

The transactions in barley have been on a very restricted scale. Even when the weather was the hottest, and the reports of the growing crop least favourable, no inclination was shown to invest in this grain. The supply brought forward, though extremely small, has proved about equal to the demand, the latter being, at this time of the year, very circumscribed. In the finer descriptions little or nothing has been done, and common runs of malting have been freely offered at 30s. per qr., which does not show any advance on previous rates. The lower kinds, employed for feeding, have met with rather more attention; but even for these it has been found impossible to obtain higher prices. Considering that the prospects for the next crop are not very encouraging, that the article is much cheaper, weight for weight, than oats, that the stock in bond in the kingdom does not much exceed 100,000 qrs., and that there is little probability of large foreign supplies, barley seems to us to have excited less attention than might have been expected.

Malt has, as usual, been a good deal influenced by the state of the barley trade, and the transactions in the article have been on a strictly retail scale. Prices have, however, been pretty well supported, factors having refrained from pressing sales.

The arrivals of oats have fallen materially short of the quantity required for the consumption of the metropolis; and the dealers have been compelled to draw largely on their stocks, leaving the market very bare. The deficiency in the supplies has been caused principally by the smallness of the receipts from Ireland and Scotland, the arrivals from our own coast, as well as the foreign supplies, having been tolerably good. Whether the advance of 2s. to 3s. per qr., established since our last, on fine corn, will be supported, must, in our opinion, depend entirely on the quantity Ireland may still be enabled to furnish between this and harvest. Should there be no increase in the arrivals from the sister isle, the release of the 100,000 or 120,000 qrs. in bond in London would produce little effect on quotations. Indeed, we question whether the liberation of that quantity, if unaccompanied by an Irish supply, would suffice to check the upward tendency in prices. The drought which prevailed during the first three weeks in June gave rise to fears for the growing crop; and this, and the certainty of the article being admissible at 1s. 6d. duty under the new bill, caused a lively demand for oats under lock, at enhanced terms. Good feeding qualities have lately commanded 21s. to 23s., and Dutch brews 24s. to 27s. per qr.; showing a rather important advance. There are at present, in round numbers, about 180,000 qrs. under lock in the kingdom. Some further, but not large arrivals, may be expected from the near continental ports; and by the end of July we may calculate on receiving nearly 100,000 qrs. more from Riga and Archangel: if, however, the Irish supplies should continue so short as they have been of late, the whole of the foreign likely to reach us will, we think, be required.

In addition to the injury presumed to have been done to the bean crop by the long continuance of hot, dry weather, it is said to have suffered very extensively from the attack of the black fly. These reports, and the smallness of the quantity brought forward at Mark Lane, have caused an enhancement in the value of the article of 4s. per qr. Egyptian beans, whether in bond on the spot, or floating cargoes not yet arrived, have advanced to fully the same extent; and a good deal of business has been done. At the close of the month of May, there were more sellers than buyers of bonded Egyptian beans at 27s.; whilst 31s. to 32s. per qr. have recently been paid.

Peas have been quite as injuriously affected by the drought as beans; but the rise in quotations has not been so great. Maple and grey peas have risen 1s. to 2s., and fine white boilers 2s. to 3s. per qr. during the month. By the official statement of stocks, we perceive that there were 66,644 qrs. of beans, and 25,315 qrs. of peas under lock in the kingdom on the 5th inst.

There is now rather a large quantity of Indian corn on the market; but this article has not met with so much favour as was expected. Some of the millers have tried the experiment of grinding it; but after a very limited trial, they have discontinued the manufacture, having found it very difficult to persuade the bakers to purchase the meal. The bulk of what is here is yellow, of only moderate quality: the finer sorts of white would probably suit the London market better, but we must confess we much doubt whether it will ever be largely employed in this country as human food.

The encouragement which will be given to importers by the low scale of new duties will render it more necessary than ever to keep our readers informed of the position of the continental and other foreign corn-markets.

The weather appears to have been of a similar character abroad to that experienced in this country. The early part of the spring was wet, and rather cold; and the different kinds of spring crops were not got in very favourably. Still, the sowing season was brought to a close without any very great inconvenience. Owing to the mild character of the winter, the wheat plant presented a very vigorous appearance in the spring. In most of the northern countries of Europe, the abundance of rain which fell there, as well as in England in April and part of May, enabled it to withstand the subsequent extreme heat; and all the accounts agree in stating that the promise for the harvest is highly favourable. Under ordinary circumstances, this would have had the effect of causing a material reduction in prices; but the change in the corn laws here has caused holders of wheat in the Baltic to remain very firm, they calculating with certainty on being hereafter able to import into England at a merely nominal duty. The smallness of the stock (for, excepting at Danzig, the quantity is decidedly small at all the north-eastern ports) has also assisted to give confidence to sellers: and whilst free wheat has receded 10s. per qr. in the English markets, the decline abroad has scarcely amounted to 5s. per qr. Quotations are, therefore, still too high to afford any inducement to our speculators to send out orders; and the business lately done at the leading markets in the Baltic has been principally on Dutch and Belgium account, the wants of these countries having obliged them to buy rather extensively.

Whilst the appearance of the growing wheat crop is favourably spoken of in Poland, Prussia, and the nearer continental countries, rye—by far the most important article of consumption—is reported to have suffered from drought; whilst barley, oats, &c., are likewise expected to be short crops all over the north and east of Europe. It is, however, probable that a similar change to that experienced here may have taken place in the weather there, and the apprehended ill effects of the drought obviated.

By the most recent advices from Danzig, we learn that several parcels of low-quality wheat had been bought at equal to 40s. to 42s. per qr. free on board, by buyers from Holland and Belgium, but that scarcely anything had been taken on British account. Really fine high mixed old wheat was then still held at 48s. per qr. At the lower Baltic ports quotations have undergone very little change, the want of stocks and the trifling nature of the supplies from the interior having rendered holders unwilling to submit to any reduction. Rostock letters of the 22nd inst. inform us that 43s. to 44s. per qr. continue to be asked for the few parcels of fine wheat in granary; and at Stettin, on the 20th June, the very best qualities were still quoted 45s. to 46s. per qr. At Hamburg, some excitement seems to have been caused by the London accounts of the 16th. An advance of 2s. per qr. was established, after receipt of the English news, on wheat; and oats were much sought after at prices quite 1s. per qr. above those previously obtainable. Several cargoes, to be shipped from Danish and Holstein ports, had been sold at 19s. to 20s. per qr. free on board. In the Dutch markets prices of wheat have lately given way; and though the article is higher in that country than here, the difference in price is not sufficient to admit of shipments from hence with a fair chance of profit. At Antwerp, Polish Odessa wheat was at one time sold at the high price of 50s. per qr.; but large supplies subsequently received had caused a reduction, and the highest quotation for this description of wheat was, on the 23rd inst., 46s. per qr. In the southern countries of Europe, much more mischief is stated to have been done by the drought, than in the north and east; and prices of wheat have recently advanced at all the principal Mediterranean ports. Quotations are, therefore, now much too high to allow of shipments being made from that quarter to the English markets. The accounts brought by the Great Western steam-ship from the United States do not generally speak favourably of the wheat crop on the other side of the Atlantic. Prices of flour and wheat had, however, receded, as well in the United States as in Canada, in consequence of the discouraging reports from England.

CURRENCY PER IMPERIAL MEASURE.

JUNE 22.

WHEAT, Essex and Kent, new, red	50	55	White..	59	64
Old, red	51	56	Do.	59	63
RYE, old	34	38	New....	38	40
BARLEY, Grinding, 24 26 Malting	30	31	Chevalier	33	—
Irish	22	24	Bere ...	22	24
MALT, Suffolk and Norfolk	58	63	Brown..	56	60
Kingston and Ware	60	—	Chevalier	65	—
OATS, Yorksh. & Lincolnshire, feed	24	27	Potato..	26	28
Youghall and Cork, black..	24	25	Cork, white	25	27
Dublin	24	25	Westport	26	27
Waterford, white	23	24	Black ..	24	25
Newry	26	27			
Galway 19	20	21			
Scotch, feed	27	28	Potato..	27	28
Clonmel	25	26	Limerick	27	28
Londonderry	28	—	Sligo	26	27
BEANS, Tick, new	36	39	Old, small	46	50
PEAS, Grey	38	41	Maple ..	35	37
White	34	38	Boilers..	42	44

FLOUR, Town-made 45 49 Suffolk 40 — per sk. of 280 lbs.
Stockton and Norfolk 38 40 Irish 41 43

FOREIGN GRAIN AND FLOUR IN BOND.

WHEAT, Dantzic	52	54	fine —		56
Hamburg	46	50			
BARLEY 18	20	22			
OATS, Brew	23	25	Feed ...	20	22
BEANS	27	30			
PEAS	34	38			
FLOUR, American, per brl 22	24	25	Baltic ..	—	—

COMPARATIVE PRICES OF GRAIN.

WEEKLY AVERAGES by the Imp. Quarter, from the Gazette, of Friday last, June 19th, 1846.	s.	d.	AVERAGES from the corresponding Gazette in the last year, Friday, June 20th, 1845.	s.	d.
WHEAT	52	0	WHEAT	48	2
BARLEY	27	1	BARLEY	30	8
OATS	23	8	OATS	22	8
RYE	32	4	RYE	31	4
BEANS	35	8	BEANS	38	1
PEAS	34	9	PEAS	37	0

IMPERIAL AVERAGES.

Week ending	Wheat.		Barley.		Oats.		Rye.		Beans.		Peas.	
May 9th	56	8	29	7	23	9	33	5	35	8	34	7
16th	57	0	29	4	24	1	33	5	35	11	34	11
23rd	55	5	28	10	23	8	34	6	36	0	34	6
30th	53	4	28	4	23	9	32	4	35	10	34	2
June 6th	52	10	27	8	23	4	32	10	35	10	34	10
13th	52	0	27	1	23	8	32	4	35	8	34	9
Aggregate average of the six weeks which regulates the duty.	54	7	28	6	23	8	33	2	35	10	34	8
Duties payable in London till Wednesday next inclusive, and at the Outports till the arrival of the mail of that day from London	18	0	9	0	5	0	9	6	7	6	8	6
Do. on grain from British possessions out of Europe	5	0	2	0	0	6	1	0	0	6	0	6

PRICES OF SEEDS.

JUNE 22.

Hitherto no Seed (except a small parcel of turnip) of this year's growth has been exhibited at market; but new Rape and Carraway Seed may be expected in the course of next week. The operations in the different kinds of

Seeds were on a restricted scale, and the only change worth notice was a tendency in prices of Canaryseed to advance.

Seed, Rape.......... 24*l*. 26*l*. Irish .. --*l*. —*l*. per last.
Ditto, new ....25*l*. —*l*. per last.
Linseed, Baltic..40 44 Odessa 45 46
Linseed, Baltic and Russia, 38 40, finer sorts, 43 45 per qr
Mustard, white 10 11 brown — — per bush.
Linseed Cakes, English..—10*l*. 10s. to 11*l*. 0s. per 1000
Linseed, English, sowing 54 60 crushing 43 45 per qr
Carraway .... 44 46 new .. 47 48 per cwt
Coriander .... 10 13 per cwt.
Mustard, brown, new.... 10 11 white.. 9 11 p. bush
Hempseed............... 35 38 per qr.
Trefoil .... 17 24 old.. — new 28
Mediter. & Odessa 44 45
Canary, 42 45

PRICES OF HOPS.

BOROUGH, Monday, June 22.

Prices of hops continue to decline, and may be quoted 8s. per cwt. lower than this day week. The market is very inactive, owing to the continuance of hot weather, which does not suit the vermin, and which has much decreased. In fact the flies are all gone, and the lice are daily diminishing.

WORCESTER, *(Saturday last.)*—Our plantation reports generally state improvement, the long continuance of hot weather having, in many places, cleared the bine of vermin and given vigour to the plant, which is growing fast and promising for a crop. In some parishes, however, the planters have given them up as lost; and one actually offered to sell the produce of a three-acre piece for *three sovereigns*, so destructive has the blight been in many of the gardens. The market is quite at a stand, although hops have been offered at a considerable reduction from last week's rates.

WOOL MARKETS.

BRITISH.

LEEDS, June 19.—Sales during the present week have been small, and last week's prices are barely maintained.

YORK, June 18.—We have had another large show of wool, and the business done was very considerable. Prices, however, have declined about 6d. per stone.

PONTEFRACT, June 13.—We had a limited show of wool, and last week's prices were readily obtained.

HULL, June 16.—The market was well supplied, and there were plenty of buyers; but the dull intelligence from several other provincial markets operated strongly upon prices, which here suffered a depression of 1s. to 1s. 6d. per ton, as compared with last week, the sales effected being at 25s. to 27s. 6d. per ton for hogg fleeces; and the growers, believing that the depression was in part attributable to the large quantities which are everywhere pouring into the markets in consequence of the great and rapid progress made in shearing during the late unsurpassed fine weather, determined generally to hold back, and a large quantity remained unsold. We fear, however, that the fall has a more serious cause; for formerly, under similar circumstances, with a brisk manufacturing trade, we have seen prices advance; and we incline to think that a slackness of orders in the mills for goods composed of British wools is the chief reason of the fall. Should a new impetus be given to the woollen trade, there will be no fear of prices being maintained.

DONCASTER, June 20.—A numerous attendance of buyers from the manufacturing districts. Fine qualities well hogged were early selected out at prices equal to last week. For the coarse heavy parcels, having a small proportion of hog fleeces, prices were rather lower, and some lots were unsold late in the day. The following quotations were the prices generally obtained. Super Clips, 14s. to 15s.; Lincolnshire, 13s. to 13s. 9d.; Inferior, 12s. to 12s. 6d.; Locks and Cots, 6s. to 9s. per stone.

FOREIGN.

CITY, Monday.—The imports of Wool into London last week were only 559 bales: viz., 377 from Bombay, 37 from Germany, 49 from Russia, 76 from the Cape of Good Hope, and 20 from Spain.

The Wool market is quiet.

Accounts of June 5th from Bautzen (Germany) state, that at the spring fair there were 7,260 stone of Wool. Fine sold at 15 to 18 rix dollars, and mid. at 11 to 13 rix dollars.

At Dessau (Germany), on the 9th June, there were 9,000 stone of Wool on sale, and the condition of the fleece is described as being very superior. A fair business was done, but prices were 2¼ to 3¼ rix dollars lower per stone than at the former market.

In the Landsberg Wool market during the fair, as we learn by advices of June 9th, prices were some dollars higher compared with previous markets. The quality, however, was very superior. There were some purchases made by Englishmen, and the combers took a good deal. Mid. Wools were better washed than those at Breslau: the supply was 9,000 cwt., and all was sold. This improved demand was expected to animate the Stettin and Berlin markets, but a great advance would check the demand.

At Posen, on the 8th June, the supplies had increased, so that altogether about 15,000 cwt. of Wool were in the market. About two-thirds had been sold, and at the same reduction as at the Breslau fair; the Wool, however, was badly got up and washed. The foreign buyers, including the English and French, did not do much business.

HIDE AND SKIN MARKET.

			s.	d.		s.	d.	
Market Hides,	56 to	64lbs.......	0	0	to	0	3	per lb.
Do.	64	72lbs.......	0	3		0	0	,,
Do.	72	80lbs.......	0	3		0	3¼	,,
Do.	80	88lbs.......	0	3¼		0	3½	,,
Do.	88	96lbs.......	0	3½		0	4	,,
Do.	96	104lbs.......	0	4		0	4½	,,
Do.	104	112lbs.......	0	4½		0	5	,,
Calf Skins			3	6		5	0	each.
Horse Hides			13	0		0	0	,,
Lambs.......			2	6		4	0	,,
Shearlings			0	8		1	1	,,

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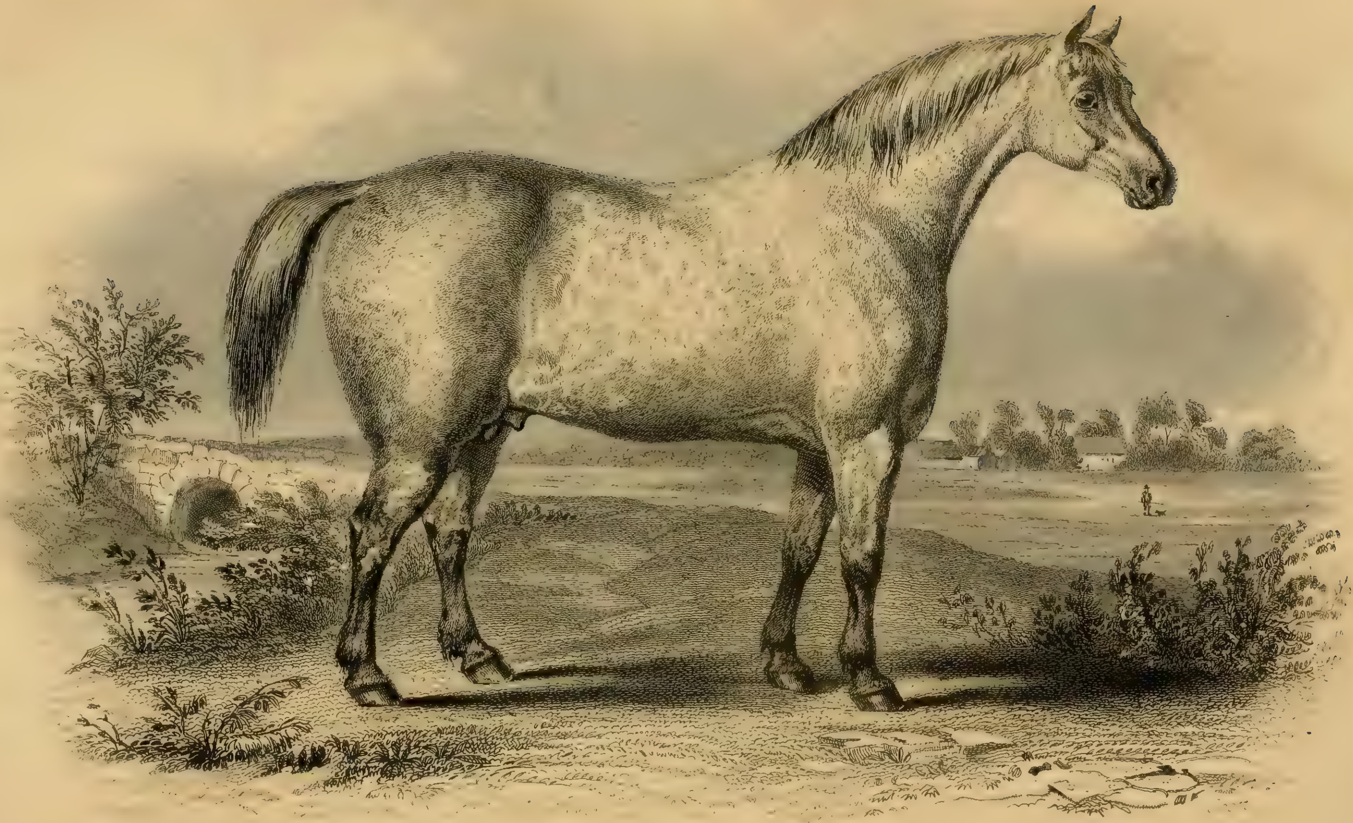

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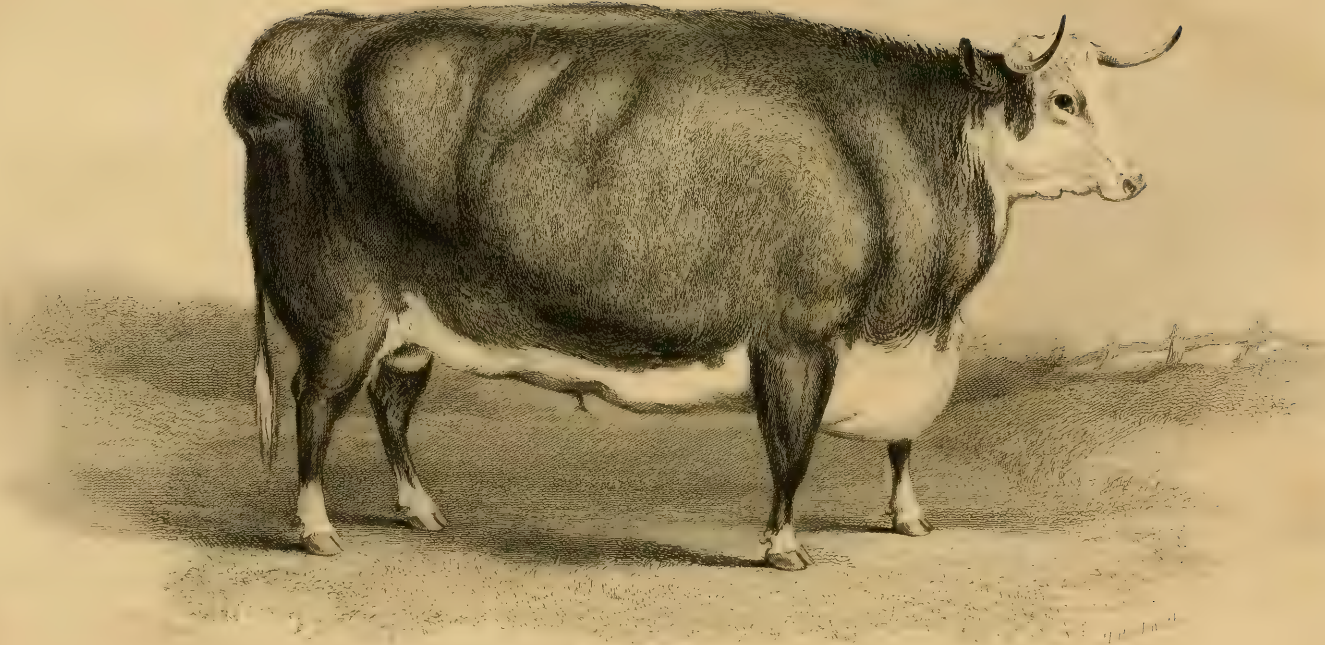

THE FARMER'S MAGAZINE.

AUGUST, 1846.

No. 2.—Vol. XIV.] [Second Series.

PLATE I.

A CART STALLION.

Our first Plate represents a Cart Stallion bred by Mr. James Frame, of Brumfield, Lanarkshire, N.B., and is the property of Mr. Thomas Richardson, of Soliman, near Brampton, Cumberland, by whom it was exhibited at the Meeting of the Highland and Agricultural Society of Scotland, at Dumfries, in October last, and obtained a prize of Forty Sovereigns as the best Cart Stallion. The animal was also successfully exhibited at the late Meeting of the Royal Agricultural Society of England at Newcastle-upon-Tyne, where a prize of Fifteen Sovereigns was awarded to Mr. Richardson.

PLATE II.

A HEREFORD OX.

Bred by Paul Prosser, Esq., of Garway Court, near Monmouth, the property of Robert Martin Layton, Esq., of Thorney Abbey, near Peterborough, Northamptonshire, for which the first prize of Twenty Sovereigns and Silver and Gold Medals were awarded at the Smithfield Cattle Show in December last.

REMARKS ON THE AGRICULTURE OF ABERDEENSHIRE.

BY THOMAS SULLIVAN.

No. III.

FARM SERVANTS.

By far the greater proportion of the farm-work in Aberdeenshire is performed by unmarried servants. Ploughing and all other operations, requiring the labour of either horses or oxen, are, for the most part, executed by young men between seventeen and thirty years of age; while the lighter, or less laborious descriptions of work, such as the pulling and collecting of weeds, the thinning and hand-hoeing of turnips, &c., are accomplished by grown-up girls and boys.

The predilection manifested in this county, and indeed throughout the north of Scotland generally, for single servants, arises from the impression that they are, upon the whole, more convenient, useful, and economical than married men would be. They are considered by the majority of farmers in this quarter to be more active on hurried occasions, more solicitous about keeping their horses, harness, &c., in proper order, besides being in general more easily taught, and more disposed to learn improved modes of executing agricultural operations. It is, therefore, only on some of the larger farms that any married servants are regularly employed, and even on these their number is very limited. It is proper to observe here, that most of the married agricultural labourers rent a house and a small *croft*, or an allotment of land, either from the farmers, or (which is the more common practice), directly from the proprietor; by which they are provided, not only with a home, but also with the means of profitably occupying their own and their families' leisure hours, while ample employment is usually to be had from the neighbouring farmers in draining, trenching, and other operations executed by the piece. Comparatively few of the farm-servants think of entering the matrimonial state until they are able to rent a cottage, with a croft of greater or less extent; and when the necessary capital is realized, little or no difficulty is experienced in obtaining a suitable possession.

The regular or constantly employed servants acquire different ranks on the farm, to which it may not be uninteresting to advert. Each of the larger class of farmers keeps a working steward, or *grieve* as he is termed, whose principal business is to get his master's orders duly executed, to see that the other servants and labourers faithfully discharge their respective duties, and to superintend the women and boys employed in gathering weeds, thinning turnips, &c., during the summer months; he also sows the seed in spring, and erects some of the corn stacks in harvest. The next in rank is the *foreman*, or first ploughman, who observes the time to commence and leave off work, and "feers," or marks off the ridges for ploughing; he leads the mowers in reaping, and assists the grieve in stacking the grain crops. Then come the second, third, fourth ploughmen, &c., according to the number of horses employed on the farm. Every farmer annually fattens a greater or less number of cattle, and some person is, of course, required for supplying them regularly with food and dry litter, and for keeping them and their apartments clean. One man is allowed to be capable of pulling turnips for, and attending to, twenty-four head of stall-fed cattle, during the feeding season. On some of the more extensive farms a *byre man* is employed, whose duty it is to feed, clean, and "look after," the milch cows and young stock. Comparatively few sheep are kept by the Aberdeenshire farmers, except in the higher districts of the county, and consequently shepherds are little required. Draining, trenching, and similar operations, are generally accomplished by a class of labourers designated "contractors," who make a practice of taking piece or job work from farmers, and are usually bound to complete it within a certain period, and according to the specifications or written agreement entered into. Draining is executed at so much per hundred yards; trenching waste ground, by the imperial or Scotch acre, as may be most convenient; and stone dikes and other fences, are constructed at a stipulated rate per lineal or running yard.

Hiring.—Farm servants are almost invariably hired by the half year, at the terms of Whitsunday (May 26), and Martinmas (November 22). Hiring, or "feeing," markets (as they are here generally termed) are held a few weeks prior to each term at Aberdeen, Inverury, and other towns throughout the county, which are commonly attended by a large concourse of farmers and servants. All classes of farm-servants are most generally engaged at the above-mentioned terms; but women and boys are occasionally hired at some of the cattle markets held previous to or about Candlemas, from that period to the ensuing Whitsunday. Reapers of both sexes are engaged for harvest work at, or near, the term of Lammas. The servants hired at these feeing-markets are very seldom required to furnish certificates as to their steadiness, and industry of character, as is the uniform custom in some other quarters, the farmers being, generally speaking, quite satisfied if the person's appearance indicates an active workman, and demand merely a verbal promise that he shall, at all times, obey the orders of the master or steward. Some sixty years ago, the connection between farmers and their servants was very different in this county from what it is at present. The majority of servants then remained with the same master until they contrived to accumulate a little capital when they married and obtained crofts, or small possessions suitable to their means; but now by far the greater number change masters every half year, in fact neither party seem much disposed to enter into longer engagements. This is attributable, partly, to a disinclination to abandon a generally established practice, however injudicious it may be; but chiefly, I apprehend, to the alleged security it affords the farmer against a bad servant, and the servant against an unreasonable master, in consequence of the period of separation being so near at hand.

No doubt half a year is fully long enough for a farmer to have to retain an indolent or a troublesome servant in his employment, or for a servant to be obliged to submit to the harshness or exactions of an unfeeling master; and in either of these cases, a short engagement is obviously of no trivial importance. But the system has been found to be productive of more than counterbalancing mischief. It generally, indeed almost necessarily, creates a spirit of restlessness, and a love of change among servants, which, when often indulged in, become a fruitful source of unhappiness to themselves, besides materially diminishing the value of their services, not to mention the number of days worse than use-uselessly spent every year at feeing-markets, nor the habits of dissipation and idleness which are there so apt to be contracted. The evils attendant on these feeing-markets for hiring servants have long been felt and complained of by intelligent farmers and others in this quarter, and various plans have been ineffectually proposed from time to time for superseding their necessity. Their abolition is in fact supposed to be now altogether impracticable; the recent establishment of "register offices" in some of the towns, for the purpose of facilitating the engaging of farm servants, has, however, been found of considerable advantage. All servants desirous of obtaining places through the instrumentality of any of these offices are required to lodge certificates of their character and capabilities from the masters whom they had previously served, with the keeper of the "register;" and these are shown to such farmers as make application. This mode of hiring is not, however, taken advantage of to the extent that its usefulness would seem to warrant.

Very few farm labourers are engaged by the year in Aberdeenshire; but judging from the experience of those districts in which the *hind* system has been long and successfully established, the advantages accruing from engagements of at least that endurance, both to the employer and the employed, appear to be important, and beyond question. The yearly hired servant generally acquires an interest in his master's prosperity, and almost invariably manifests a greater regree of anxiety in the prosecution of his business than the labourer whose connection with his employer is likely to be of only a temporary duration. Yearly hired servants are, further, allowed to be in general more trustworthy, and less unwilling to work beyond the ordinary hours of labour at seed time, harvest, or on other hurried occasions, than those that are engaged by the half year. The truth of these remarks is abundantly confirmed on every farm in this county on which a few married men are employed, and accommodated with cottages and small gardens, as they prove with few exceptions the most steady and useful servants.*

Wages.—The wages of a grieve and other farm servants are usually as follows for the summer half-year, with board and lodging:—

	£	s.		£	s.
Grieve - -	8	0	to	8	10
1st Ploughman -	7	0		7	10
2nd ditto -	6	10		6	15
3rd ditto -	5	15		6	0
Orra man (a man of all work)	4	10		5	0
Female field-worker -	3	0		3	5
Boys - -	2	0		2	7

The rates for the winter half-year (from Martinmas to Whitsunday) are always somewhat lower than the above. Where a few married servants are regularly employed, they usually get a boll and a-half (1 cwt. 3 qrs. 4lbs.) of oatmeal, and from £7 to £9 in money, per annum, with a cottage, and the keep of a cow all the year round. Their fuel is also carted home free of expense, and they get their food from the farmer during harvest. Day-labourers commonly get ten shillings per week without victuals; women ten pence a day, for thinning and hand-hoeing turnips, weeding, &c. The cost of work done by the piece, or by "contract," as it is termed, is, of course, regulated by the current rate of wages in the locality at the time. Furrow drains, two and a-half feet in depth, are cut and filled with broken stones at from 11s. to 14s. per hundred yards, according to the nature of the soil, and other circumstances. The charge for trenching waste land to the depth of sixteen inches, and placing all the stones on the surface of the trenched ground, varies from £5 to £9 per imperial acre. Stone dikes, three feet nine inches in height, three feet wide at the bottom, and 15 inches at top, are constructed at from four pence halfpenny to six pence per lineal yard. The subjoined statement of the wages of farm-servants in Aberdeenshire for the last six years may, perhaps, be interesting. The rates are those that were given at the feeing markets held at Inverury, and are exclusive of board and lodging.

	1840.				1841.				1842.				1843.				1844.				1845.			
	Summer.		Winter.		Summer.		Winter.		Summer.		Winter.		Summer.		Winter.		Summer.		Winter.		Summer.		Winter.	
	£	s.	£	s.	£	s	£	s.	£	s.	£	s.	£	s.	£	s.	£	s.	£	s.	£	s.	£	s.
Grieve	8	0	7	7	8	10	7	15	8	10	7	7	7	10	7	10	8	0	7	10	8	0	8	0
1st Ploughman . .	7	0	6	10	7	10	6	10	8	0	7	7	6	6	6	0	7	0	6	0	7	9	7	0
2nd do.	6	10	5	10	6	12	5	15	6	12	5	5	6	0	5	5	6	10	5	5	6	0	6	0
3rd do.	6	0	5	10	6	0	5	8	6	0	5	5	5	15	5	0	6	0	5	0	5	15	5	12
Orra man . . .	5	0	4	10	5	10	4	10	5	5	4	4	4	10	4	10	4	12	4	0	4	10	4	15
Female field-worker	3	0	1	10	3	3	1	10	3	3	1	5	2	15	1	10	3	0	1	10	3	5	1	15
Boys	2	7	1	15	2	5	1	15	2	7	1	12	2	5	1	15	2	7	1	12	2	5	1	15

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* The *hind system* here alluded to has been established from a remote period in the Lothians, Berwickshire, Roxburghshire, and Northumberland.

Grain crops are almost exclusively cut down in this quarter by the scythe, the sickle being now employed only in the reaping of patches very much laid and entangled. Subjoined are the rates of wages (with board and lodging) which have been given to reapers, during the last seven years, for executing the harvest work, however long it may last:—

	1839.			1840.			1841.			1842.			1843.			1844.			1845.		
	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*
Scythesmen	2	10	0	2	12	6	2	15	0	2	10	0	2	10	0	2	7	6	2	12	6
Bandsters	2	9	0	2	9	3	2	10	0	2	8	0	2	4	0	2	5	0	2	9	0
Rakers (to three scythes) . .	2	9	0	2	7	6	2	10	0	2	8	0	2	4	0	2	5	0	2	9	0
Gatherers	1	18	0	1	7	9	2	0	0	1	13	6	1	15	0	1	13	6	2	0	0

Food.—The staple food of the farm servants and labourers in Aberdeenshire is oatmeal. This article is made use of in a variety of forms. When the servants are boarded in the farmer's house, their breakfast usually consists of porridge with oatmeal bread and milk *ad libitum*: when milk is scarce, beer is used as a substitute. Potatoes are generally given to dinner, together with bread and milk, and occasionally broth; and the supper is usually composed of either milk-porridge (oatmeal boiled in milk), or what is called "kail-brose," a dish which is, I believe, peculiar to Aberdeenshire. This species of brose is formed by pouring the juice of boiled greens or cabbage into a dish in which a small quantity of oatmeal has been put; the whole being stirred, and more of the liquid added, till it be brought to the proper consistence: this is regarded as a very wholesome and nutritious article of food. Butcher's-meat is a luxury, very rarely partaken of except at Christmas. The foregoing dietary is estimated to cost about eightpence a day for each servant.

The food given to reapers in this and other parts of the north of Scotland is commonly oatmeal porridge and milk for breakfast and dinner, potatoes and milk for supper, with as much oatmeal bread at every meal as they wish to use, and two quart bottles of beer daily to every person. Refreshments of bread and milk are also given between the regular meals; and the average cost of the whole is estimated at about eleven pence per day for each reaper.

Bothy System.—Prior to the last thirty years all he farm servants were boarded and lodged in their masters' houses; but this mode of maintaining them became latterly productive of great inconvenience and annoyance to the family, and another method has since been devised with the view of remedying the evil by excluding them altogether from the farmer's dwelling—I allude to the bothy system, which, some time ago, received no small share of public reprobation, but is, nevertheless, rather on the increase than otherwise, being now quite general throughout the north and east of Scotland. As this mode of keeping farm servants differs essentially from that which is adopted in the southern counties, a brief description of it may not be uninteresting to general readers. It relates exclusively to single men, who are hired by the half year for performing the ploughing, carting, and other routine operations on a farm. As already stated, their wages vary from £10 to £12 per annum, besides two pecks (17½lbs.) of oatmeal in the week, and two pints* of milk daily, or an equivalent in money. Potatoes are occasionally given during the winter half year. Their general diet is *brose* made of oatmeal and boiling water, to which a little sweet milk is added, and this is taken three times a day. They are provided with a room or house, which is designated the "bothy," and is usually connected with, or situated adjacent to the farm offices. In this apartment all the unmarried men regularly employed on the farm spend their leisure hours, and cook their victuals; fuel, and a few simple utensils for cooking, being furnished by the farmer. It also sometimes serves as a dormitory for the servants, and in this case is provided with panelled beds; but generally the sleeping place is in an adjoining room, or in the stable. In many of the larger establishments a woman is allowed for kindling the fire, keeping the bothy clean, &c.; but in general all these matters have to be attended to by the servants themselves.

Most farm servants prefer being "bothied," to boarding in the farmer's kitchen, probably on account of the greater liberty which they thus enjoy; while the masters find this choice to be most convenient and agreeable to themselves. Hence one great reason why the bothy system is more or less generally established throughout Aberdeenshire, and other counties in the north and east of Scotland, where unmarried servants are mostly employed for carrying on the regular farm work. But, however convenient it may be, there are many evils inseparable from it, which affect the servants themselves directly, their employers indirectly. In order to give some idea of the tendency of the bothy system, I shall here quote a few remarks from an admirable essay on the subject by Mr. James Cowie, Mains of Haulkerton, Kincardinshire.

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* The Scotch pint is equal to about two *imperial quarts*.

"While the servants were retained in the farmhouse, they were kept under restraint by the occasional presence or neighbourhood of their master and mistress. They were prevented from encouraging bad and promiscuous company in their abodes, they were necessarily restricted from improper conduct, and they had regular hours to observe in retiring to rest. In the bothy, however, they are free from every restraint and control. They frequently congregate from the neighbouring farms, and form a considerable company, sometimes consisting of both sexes. At many of these meetings, which, be it remarked, take place frequently on Sundays, where they are neither in the sight nor hearing of their superiors, the most obscene conversation, levity of conduct, and rude manners are freely indulged; gaming, singing, and uttering desultory and unseemly jests, occupy almost their whole time. It is a fact, moreover, which cannot be concealed, that those who are most depraved sometimes resort to dishonourable and dishonest practices, in order to afford entertainment on these as well as on ordinary occasions; they hesitate not to commit acts for which they are amenable to the criminal laws of their country. They lay hold of every household article which they by stealth can get at, with the assistance, commonly, of the female servants; bread, butter, hams, fowls, eggs, &c., are all more or less objects of plunder, and greedily devoured without compunction. In justice to the better principled servants, of whom there are not a few, it must be stated that these highly censurable proceedings are condemned in the better regulated bothies; and even many of those who do participate, act more from wantonness and ignorance of the crime than from abandoned habits."

It would be unjust to conclude without remarking that considerable improvement has latterly taken place in the management of bothies in Aberdeenshire; but, at the best, the system is anything but deserving of imitation. Mr. Cowie considers that it is not susceptible of improvement, and therefore advocates its entire abolition. As a substitute he recommends the erection of a few cottages on every farm for married servants, with whom the single men are to be lodged.

SIZE OF FARMS, &c..

Very great diversity exists in the size of farms in Aberdeenshire. In some parts they are mostly of considerable extent, while in others they are generally small. The possessions in this county may not improperly be divided into four classes; namely, large, medium sized, and small farms, and what are here denominated "crofts," which vary in extent from two to ten Scotch acres. In all the higher, and in many of the interior districts, where a greater or less proportion of waste land is almost invariably attached to every farm, it is by no means uncommon for one tenant to occupy from two hundred and fifty to four hundred and fifty acres, and not a few possess considerably more. Even in the lower and comparatively improved parts of the county, in which the greater proportion of the soil is arable, there exists a large number of farms ranging in size from one hundred and fifty to three hundred and fifty statute acres. The divisions of Buchan and Formartin contain several farms of about three hundred acres, and some of even considerably greater extent; indeed, obviously, rather extensive in proportion to the amount of capital apparently at the command of their respective occupiers. It must be evident to all conversant with agricultural pursuits, that much too great anxiety is manifested by the generality of farmers to rent larger possessions than the extent of their available resources would warrant; and it must be allowed that this is the case in Aberdeenshire, as well as in other parts of the country, though there are, no doubt, numerous exceptions. Not that arable farms are actually larger in this than in other localities, for the contrary is perhaps the case: but generally speaking, the tenantry as a body are not quite so wealthy and independent as those of the Lothians, and some other districts throughout the kingdom, which abound with extensive possessions. It is not very difficult to conceive, and experience has long since abundantly confirmed the fact, that the almost inevitable results of occupying farms disproportionate in size to the amount of capital invested in their cultivation, are inadequate and imperfect tillage, defective implements, insufficient manuring, and as a necessary consequence deficient produce. Draining and other important, and in most cases essential, improvements cannot of course be undertaken to any extent, or executed in an efficient manner, without the command of ample funds; and the occurrence of a few unpropitious seasons or deficient harvests may prove altogether ruinous. Hence the productive capabilities of the soil are not developed to the extent which would undoubtedly be attained by the judicious outlay of sufficient capital in its improvement and cultivation.

There is a great number of medium-sized farms throughout this county, and the number of this class is steadily on the increase. They vary in extent from eighty to one hundred and forty acres. Those between seventy and one hundred and ten acres are generally worked by a pair of horses and a pair of oxen; those from the latter size to one hundred and forty acres, require the regular labour of two pairs of horses. Experience has, in numerous instances, shown that medium-sized farms, in the cultivation of which adequate capital is invested, are more likely to remunerate the tenants for their labour and expense, than much larger holdings with insufficient means for prosecuting their management.

The number of farms under a hundred acres is very considerable; indeed it is highly probable that there are more below than above that size. Possessions of greater extent than ten acres are commonly called "small farms;" those under that size are designated "crofts." The majority of the small farms furnish employment during the greater part of the year to a pair of horses, or to a horse and an ox, which are very commonly yoked together in the same team, for ploughing, harrowing, &c., by the small farmers of Aberdeenshire, the extent of whose possessions does not require, or afford to keep a pair of horses. This system is found to be most advantageous and economical, and well adapted to the circumstances of the smaller class of occupiers in this locality. A stout three-year old ox is purchased about the beginning of October; and being in general required to plough only for five or six hours per day, and wholly idle during frosty weather, he is maintained in such good condition as to be again readily disposed of at a profit after the completion of turnip sowing. Such a team is capable of executing the general work of at least forty imperial acres of land of the ordinary texture met with in this county. Where the holdings are under thirty acres, which is very commonly the case in the vicinity of the towns and villages, it is customary for two neighbouring tenants, each of whom keeps a hor to unite in forming a team, when the operations of ploughing and harrowing are required to be accomplished by either. This very convenient arrangement is more or less general in the neighbourhood of all the towns and villages throughout the county, and is productive of great advantage to the industrious class by whom it is adopted.

The crofts, or smallest class of holding, are confined for the most part to the vicinity of Aberdeen, and other towns, where they are very numerous. These small possessions vary in size from two to ten acres, and, being occupied by labourers and tradesmen, are cultivated almost exclusively by the spade. There is probably no other county north of the Tweed that contains so many of these crofts or allotments as Aberdeenshire, or in which they have existed for so long a period without undergoing any material alteration or augmentation. Several reasons, some of which are contradictory of each other, have been adduced to account for this circumstance. In Dr. Skene Keith's agricultural survey of this county, there is a good deal of speculation on this point. Dr. James Anderson, who previously drew up a brief report of the rural economy of Aberdeenshire, for the consideration of the Board of Agriculture, most of which is quoted in the more elaborate survey of the former writer, states, in reference to this subject, that the farms were of much greater extent, and the farmers in general more wealthy and respectable, about the middle of the seventeenth century, than at the period at which he wrote (1793). The principal cause which led to the subsequent subdivision of farms, he considered to have been the occurrence of seven successive years of scarcity, from 1693 to 1700. It appears that the crops during that time were so deficient that a famine prevailed to such a degree as greatly to diminish the population. Many substantial tenants were reduced to poverty, and compelled to throw their farms into the hands of the proprietors, and other tenants capable of stocking them could not be found. In order to "induce poor men, the only persons then to be found, to take farms, they were made small, to adapt them more nearly to the circumstances of the tenants; and even then it frequently happened that the landlord was fain to give a team of oxen, or some milch cows as a present, to induce the tenants to accept of these small farms. At that period, sheep were entirely banished from the lower districts of the county; for, although when the farms were large such flocks were kept as could afford the expense of a shepherd to attend them, when they became small this could not be done; and as money to purchase a flock could not be easily commanded, these two considerations concurring banished the sheep entirely, and with them the corn that was to be produced from their fold. After that time, the stocking manufacture affording a ready resource to those who had a small bit of land to produce a little meal, many persons chose rather to betake themselves to that mode of life than to continue labouring servants. Servants, of course, became more scarce, and their wages high; they soon acquired as much money as enabled them to take one of these small possessions from two to five pounds rent; and many proprietors, tempted by an offer of rent seemingly high for these small patches, broke down their farms into minute allotments."*

Dr. Anderson has further remarked, that many extensive tracts of land, which had been in cultivation during the existence of large farms prior to the seven years of scarcity, were subsequently abandoned as wastes, and became covered with heath. Dr. Keith was, however, of a contrary opinion. He considered that the seven unfruitful seasons alluded to had not the effect of breaking down, but rather of enlarging farms, in order to induce the few persons who had any capital remaining, to take them from the proprietors; and further adds, that " too many landlords, in order to increase their rents, broke down their farms from the year 1760 to 1782, and these small tenants getting one or two weak horses united them with their cows in a wretched plough. The very unfavourable season of 1782 wasted their capital; and such as survived that shock, were unable to get over the two calamitous years of 1799 and 1800. The landlords in general saw the bad consequences of letting their lands to men who had neither knowledge nor capital, and a number of these small possessions have been reunited into their ancient farms." The small farms in this county are much higher rented per acre than the more extensive holdings, for which there is less competition: and as the estates are not in general very large, nor the proprietors very wealthy, this circumstance may, in a great degree, account for the continuance of the system.

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* See Keith's Survey, p. 144.

In most parts of Aberdeenshire, and particularly in the higher districts, there are considerable tracts of waste land now covered with heath and gorse, but which present indisputable evidence of having been under the dominion of the plough at some former period, the high raised, crooked, ridges into which it was disposed not being yet quite obliterated. Dr. Anderson attributed the abandonment of these tracts of land to the occurrence of the years of dearth already referred to; while Dr. Keith, alluding to the same subject, remarks, " that the many traces of the plough which appear on the ridges of high hills, where the ground is now covered with heath, are not to be ascribed to the desertion of farms from 1683 to 1700, but to a different cause, and a much more remote period. In the ancient and uncultivated state of the lands of this county, the lower parts of Aberdeenshire, and almost all the glens and valleys, were one vast forest; the little arable land was on the sides or ridges of the hills. When the country became populous, and the inhabitants more attentive to agriculture, after the valleys were cleared of wood, the plough was brought down from the hills to the plains; and as the latter were more fertile and more easily cultivated, the former were deserted by the farmer."*

It is deemed unnecessary to occupy space by entering at any length into the comparative advantages of large and small farms, as this subject has long constituted a fruitful source of controversy among speculative agriculturists, and the writer of these observations is quite satisfied that the question is mainly dependent on situation, and various other local circumstances. However problematical the advantage of very small farms may be to the nation at large, it is undeniable that the croft system has been found to work admirably well in the immediate vicinity of Aberdeen and a few other towns in this county, a fact which is abundantly confirmed by the high rental and singular productiveness of the land so occupied. In the immediate neighbourhood of a considerable town, the small farmer or crofter has at all times a ready market for his surplus produce, and an abundant supply of excellent manure always at command, besides several other obvious conveniences; and certainly no large occupiers, cultivating the soil exclusively by the plough, as in the interior of the county, could raise such large crops of grain, roots, and grass, or afford to pay such high rents, as do the cotters and small farmers in the suburbs of Aberdeen, who till their piece of ground by the spade alone, or by the spade and plough alternately. The condition of this class is, however, very different in the interior of the county, and in situations remote from towns, where the soil is, in general, still susceptible of vast improvement. It admits, I think, of the clearest proof, that before the croft or allotment system can be advantageously adopted in any locality, the land must have previously undergone considerable improvement by means of draining (if necessary) or otherwise; inasmuch as cottagers destitute of capital cannot be expected to be able to execute any costly or extensive undertaking; and without drainage and adequate manuring, most, if not all, wet soils must remain comparatively unproductive. Hence these small possessions are, generally speaking, very ill adapted to the existing condition of the soil in most parts of Aberdeenshire, where, notwithstanding the great improvements that have already been effected, so much remains yet to be done. It is only the large and the middle class of farmers who possess sufficient capital to accomplish any expensive undertaking, even with the aid usually afforded by the proprietors; and it is therefore but reasonable to presume that there exists a general disposition among the landlords of this county to augment the size of farms, though there are also some who encourage the small-farm system.

The crofts and small holdings are for the most part occupied by persons who had previously been servants to the larger farmers, and had annually saved a portion of their wages, in the hope of eventually being enabled to rent a piece of ground for themselves. Very many of the Aberdeenshire farm servants look forward from an early period to such a consummation; which is certainly a most laudable ambition, and it could nowhere be indulged in with greater prospect of attainment than in this county, which abounds with possessions of every size, and suited to the resources of all. It must be admitted, however, that, generally speaking, the condition of the very small holders of land, or "crofters" as they are commonly designated, is but few degrees (if any) above that of the ploughmen on the larger class of farms, except indeed in the immediate vicinity of the towns; while in not a few instances they certainly are rather worse off. As has been already remarked, they have in most cases very high rents to pay; and though toiling with the utmost assiduity, and living in the most frugal manner, they find some difficulty in meeting this and other engagements. The idea of comparative independence, arising from being the possessor of a few acres, may in some degree reconcile the industrious cottager to the many hardships and privations to which his station in life subjects him, but it can in no wise mitigate their actual severity. Owing to the prevalence of the "bothy" system of managing farm-servants, referred to in a preceding page of this article, very few married men are employed on farms, at least, not in the capacity of ploughmen; and hence, no doubt, one great reason for the anxiety so generally manifested by labourers to have a few acres of ground attached to their homes. Where a man obtains regular employment in his own immediate neighbourhood, a croft is to him of unquestionable utility, as furnishing a small field for the industry of himself and family when not otherwise engaged. It affords the means of initiating his children into the use of the spade and hoe, not to mention the value of the vegetables thus raised; but to be of real advantage to a labouring man, the land must be *good, and moderately rented.*

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* See Keith's Survey, p. 152.

It is the opinion of some of the most intelligent agriculturists in this quarter, that farms of such a size as to require the regular work of three pairs of horses throughout the year, are the most advantageous to the tenants and the community at large, all other things being the same, as occasioning the least waste of labour, and with proper management yielding the largest acreable produce. When only two horses are employed, a great waste of time and labour is necessarily occasioned in frequently changing from one operation to another. As a striking illustration of the advantage of large over very small farms, I shall conclude with another extract from Dr. Keith's survey: In the chapter on the "Distribution of Crop," he mentions the case of a farmer, with whom the present writer of these remarks has also been acquainted, who began upon nearly 300 acres with only £200 of capital; but from the indulgence of his landlord for some years after the commencement of the lease, from the good opinion of his industry and character which procured him credit, from living with economy till he had acquired some capital, and from the particular attention paid to the rearing and feeding of black cattle, has raised his whole stock of horses, cattle, and farm produce to £3,700; has enclosed the greater part of his farm; has embanked a thousand yards of the river Don, which frequently overflowed and destroyed the crops of the old farmers; has improved his land by lime, draining, dung, and green crops, and laid out so much on buildings, that the remainder of his lease (fifteen years) would sell for at least other £3,700; while the proprietor at its expiration will at least *quadruple* his rent, and the real value of the farm will be *more than double* of what it would have been, if it had continued in the possession of the *five old farmers* who formerly rented it."*

May, 1846.

ELECTRO-CULTURE OF FARM AND GARDEN CROPS.

BY MR. TOWERS, MEMBER R.A.S., H.S.L., ETC.

In my late article upon the "Oak and the Ash" I solicited the attention of naturalists and persons of observation to the indications which, it had been said, were given by the condition of these two particular trees at a period when the actual state of the weather—in accordance with the prognostic of the March equinox—gave promise of continuous rains, and consequently of an unfavourable, if not wet summer.

During April it had rained on twenty-five or twenty-six days, and was proportionably cold. Yet the oaks continued far in advance of the ash-trees; and they who believed, upon observation, that whenever this relative position was established, a *fine* and *warm* summer would be the undoubted result continued unshaken in their faith, and, in defiance of threatening aspects, still affirmed it.

May improved, but the weather remained unsettled till after the visitation of the parching east wind on the 14th, which appears to have blighted the apple and pear crops, and almost entirely destroyed the plums. At length, however, after rain, hail, and thunder, on the 19th, a decided melioration took place, the nights became warm, the days hot and cloudless—the temperature high, almost beyond precedent.

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* See Keith's Survey, p. 163.

Has any one recollection of a similar period of bright summer weather, with a midday temperature rarely under 75°, and thence upwards to 92°, from the 22nd of May to the 12th of June, when at noon I find the average of two thermometers—one in the open air, facing the north; the other (a Six's) under a slated roof, shaded, but exposed to the full air—to be 80° at noon, wind W. by N., with every sign of continuance? The years 1818 and 1825 afford comparisons; but there we must stop, for where was the hay-crop? Now it is magnificent and profuse, almost beyond example!

If the summer respond to the existing promise, it will go far to verify the prediction and justify the theory of those who announced the early leafing of the oak as a precursor of a fine season. The year 1844 may assuredly be cited in evidence; but that, too, proved fatal by its early aridity, as every grass-farmer can painfully attest. I wish I could refer to the wet years of 1839, 1841, 1843, and 1845; but, not having paid any attention to the subject, I have no personal evidence. Conversing, however, with a gentleman, a few days ago, he assured me, on his certain recollection, that the ash-trees were very early, and the oaks tardy in 1845. We require proofs; and as any natural index, founded upon electrical observations, must be useful to agriculture, I feel it an imperative duty thus to recur to existing circumstances as connected with the theory.

It is now a fitting opportunity to advert to the agency of electro-magnetism as applicable to the scientific culture of farm and garden crops, and thus to direct the reader's attention to that masterly essay by Mr. Sturgeon, in the "Edinburgh Journal of Agriculture" of March last, New Series, No. 12. In order to do justice to a treatise which ought to be studied throughout, I will not mutilate it by a series of tantalizing extracts, but, contenting myself with quoting two or three striking passages, will offer a digest or outline of the whole plan.

Mr. Sturgeon commences by alluding to the unpropitious views taken of electro-culture, in consequence of reports—extensively circulated—of almost total failure in the numerous experiments lately attempted; and, on the other hand, he perceives much of hostile prejudice, deeply rooted in the minds of persons "who consider themselves qualified to judge from their theoretical knowledge alone."

He views the subject as "highly interesting" in itself, and undertakes the essay for the sole purpose of stimulating farmers, &c., to pursue their inquiries in this important branch of research, "the results of which, in various cases, appear to be so highly promising to their own interests."

Before giving the *heads* of the Essay in the order wherein they are offered, I venture, on my own conviction, to prognosticate that by this treatise a foundation has been laid in the science of agriculture, upon which will be erected an electrical hypothesis far more comprehensive than any which has emanated from the laboratory. We *know* but little at present; but there are minds to which it is permitted intuitively to conceive by what powers or physical forces the organs of plants are enabled to keep in operation their respective functions of vegetable life: they also foresee that this problem, which Mr. Sturgeon considers the most formidable and yet noble bulwark yet to be assailed in our inquiries respecting the functions of vegetable vitality, will be solved by the discovery that the attraction and repulsion of every particle of matter throughout nature depends solely upon the electrizing principle of solar light.

Mr. Sturgeon's Essay comprises seven heads or sections: the subjects are—

No. 1. "On the Disadvantages experienced in the Cultivating of Farm Crops, from a Want of Scientific System."

Herein the author laments the ignorance that still prevails, and shows that "the conflicting opinions of scientific men respecting vegetable physiology, the constituent elements of various kinds of grain and other crops, the appropriation of manures, their uses, or their totally useless influence in certain soils, the rotation of crops of the same kinds, or of different kinds, &c., are ample illustrations of the present lamentable state of information on the vital elements of scientific farming."

No. 2. "Brief Outline of the experimental Operations of Philosophers by the Employment of the Electric Influence artificially brought into play in the Culture of Plants, &c., and of their Opinions respecting the Influence of atmospheric Electricity on Vegetation."

This head contains a very interesting review of the experiments, and inferences from them, of Davy, of Maimbray before him, of the Abbé Nollet, and several of his contemporaries. It cites the more recent experiments of Mr. Pine, of Maidstone, Mr. Weekes, of Sandwich, with a cut exhibiting the marked effects of a small galvanic battery employed by the latter upon parts of an apple-tree, other portions being "dead or very sickly from the ravages of canker."

No. 3. "On the elementary Principles of Electricity necessary to be understood by the Electro-Culturist."

This section requires to be deeply studied. It treats of the prime doctrines of induction and of electric polarization. Our views hereafter will, perhaps, be modified; but, at present, the careful reader can obtain from it a very correct opinion of received theory. "The electro-polar condition of plants qualifies them in an eminent degree for the performance of those operations which develop electro-chemical phenomena." "No doubt can now remain respecting the influence of electric forces in rearing, adorning, and giving full development to every class of vegetable structure."

No. 4. "Atmospheric Electricity."

This section is peculiarly estimable, inasmuch as it revives again the labours of many philosophers of the last century, and, above all, those of Father Beccaria, Professor of Natural Philosophy in the University of Turin. His experiments with wires stretched from steeps and eminences, varying in length from 112 to even 1600 feet, demonstrated the presence of atmospheric electricity. "On the 11th May, 1757, he stretched a long rope of metallic wires across the River Po, from the Villa of the Mission to the Valentin; and from this rope an iron wire was continued to the portico of the Botanic Garden, from which electric sparks were frequently drawn the following day, and at other times subsequently. From these, and from other apparatus of the kind in "Piedmont and its Alpine and Apennine boundaries," Father Beccaria was led to infer that during serene weather atmospheric electricity is constantly of the excessive or positive kind.

The most remarkable phenomena have been produced very recently by M. Weekes, of Sandwich. His apparatus consisted of "365 yards of wire, stretched over a part of the town, between the church-steeples, with a branch-wire descending into his laboratory. On the 9th of May, 1841, while a hail-storm, with flashes of lightning was raging on every side, "Torrents of sparks, three-and-a-half inches long, rushed through the apparatus, and so vivid as to dazzle the eyes of the observers, attended by stunning reports. Flashes of the electric fluid were seen darting among the various pieces of apparatus, in almost every part of the laboratory," &c. &c. "The sublime scene lasted about an hour and a quarter."

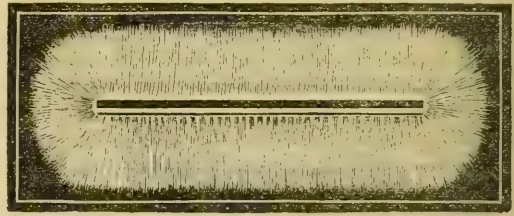
These proofs, and multitudes of others which Mr. Sturgeon has collected, demonstrative of the presence of electricity in the atmosphere, and of the possibility which exists of conveying it to the earth, naturally introduce the succeeding section.

No. 5. "On the Practice of Electro-Culture of Farm Crops."

Mr. Sturgeon says—"There is every probability before us, and not even a suspicion left to the contrary, that the grand stimulus of vegetable life is the electric fluid; under which impression we are forced to acknowledge that agent to be as essential to the welfare of plants as either rain or manures; for, independently of a stimulating force, neither manure, rain, nor soil, could lend even the remotest aid in propagating vegetable structures."

He then refers to the experiments of Dr. Forster, of Findrassee; gives a diagram of the plan suggested by that gentleman, exhibiting an oblong piece of land, with an elevated wire stretched across two poles, in the direction of the magnetic north and south; but adding another figure, by which it is shown that any electric fluid collected by that wire, brought down to and connected with other wires buried around the plot, would by those wires be radiated and distributed on all sides of them, so that the ground would become an electrized plane. This circumstance had been overlooked; and therefore it was argued that the fluid brought into the underground wires would merely pass along or through them as a simple current, leaving the soil entirely unpenetrated and unaffected.

By the annexed figure, which Mr. Sturgeon has given in a note at page 283, some idea will be formed of the distribution of electric or magneto-electric fluid, when a current is made to pass along a wire. The phenomenon is illustrated artificially, by laying a wire upon a plate of resinous substance, like that with which instrument-makers prepare the *electrophorus;* and when an electric stream is made to pass through the wire, it spreads on every side, as shown above. It is stated by Mr. Sturgeon that "the figure of the spot thus electrified is brought into view by projecting flour of brimstone upon it. On a better conducting surface the distribution is more extensive, but still in a similar manner."



Any electrician can satisfy himself on this point; and as natural electricity* brought from the atmosphere produces corresponding effects, the fluid which passes into and around a wire below the surface of the soil will perform a similar rôle, and to an enlarged extent in proportion as moist soil is a better conductor than resin.

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* All electricity is natural; but the term is here adopted merely as a mark of distinction between the electricity exerted in the great phenomena of nature and that which we excite and render visible by our machines of artificial construction.

Dr. Forster's experiments were, therefore, based on philosophical truth; and Mr. Sturgeon proceeds to investigate minutiæ, the general principles being admitted and proved. He erected, and gives figures of several modifications, the details of which are ably described in this section.

In No. 6, "The Results of the foregoing Experiments are fully described."

The weather had, upon the whole, been unpropitious, and the results less manifest than they otherwise would have been. If the weather be dry and serene, the atmosphere is charged with positive electricity, and will communicate much to the systems of wire above and below the surface; but every one must recollect that the weather of 1845 was cold and cheerless, generally—excepting a few excessively hot days early in June and in the first week in July—wet, and gloomy. Still, under every disadvantage, effects were evident, particularly with the oats; and, according to the report of the reapers, "the finest part of the crop, in *every respect*, was within the wires and close about them."

In electro-culture, every one who experiments ought to pay strict attention to the electrical laws: thus, a dry state of atmosphere must be considered favourable to the supply of a large quantity of electricity, while, at the same time, a dry condition of the soil is unfavourable to the distribution of that fluid by the underground wires.

The following laws, as given by Mr. Sturgeon, should also be particularly attended to:—

(*a*) "In every case when the air is dry, the apparatus will collect and carry down to the land an immense quantity of fluid, which otherwise it would not obtain. Therefore, under these circumstances, the *intensity* of the electric action will always be greatest about the underground wires, whatever may be the nature of the soil in which they are placed." If the soil be *dry*, the action "will be more conspicuously marked in its limitations *about* the apparatus, than on wet land, over which it would be more rapidly and generally distributed."

(*b*) *Genial showers*, laden with electricity, "soon saturate the land with water, rendering it a good conductor, and supply it abundantly with the electric stimulus. The air also, being now moist, loses its insulatory quality, and becomes more uniformly charged with electric fluid to a great height above the surface of the land, and yields it as abundantly to the pointed and sharp-edged leaves of corn and grass as to other conductors more elevated in their vicinity. Under these circumstances, the wires suspended between the poles lose all their superiority over the plants themselves in drawing electric fluid from the air, and become completely incapacitated for bringing down an extra supply from an upper stratum in which they are situated."

No. 7. "Remarks and practical Rules for future Experiments."

M. Ampare, a French philosopher, advanced an hypothesis, about the year 1821, that a continuous flow, or current of electricity round the earth, from east to west, might account for the magnetism of the earth; and Dr. Forster appears to have entertained a similar opinion, since he directed his collecting wires to be suspended from lofty poles, in the line of the magnetic north and south. Mr. Sturgeon does not believe that an electric tide sweeps the surface of the land from east to west; though, in consequence of the rapid diurnal motion of the earth from west to east, such a tide might be admitted as at least a possible phenomenon. As there is no means of confining electric influence within the limits of a marginal wire in the ground, he considers there is no authority from facts for making choice of the magnetic meridian. He proposes, therefore, that the prevailing winds should be attended to; and, as these are chiefly *easterly* in spring, and *westerly* during most of the summer, in Great Britain, he recommends that a pair of wires be stretched in a north-east and south-west direction; and another pair, beneath or above, crossing them at right angles—that is, from north-west to south-east; the wires to be always of copper, which is a better conductor, and not subject to rust or decay. "If each strand be not more than 50 yards long, four poles, one at each end, will be sufficient." The underground wires might correspond with the four prime conductors. No border wire, as in Dr. Forster's arrangement, will be required; but each of the four main ground-wires should be furnished with extra branch or subsidiary wires to promote an extensive distribution of the electric fluid. Thus Fig. 1 would exhibit the situation of the stretched wires, and Fig. 2 that of the underground radiators. The *black* lines indicate the four main wires: the *dotted* lines show the branch wires.

FIG. 1.

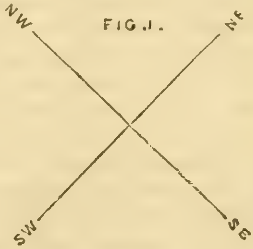
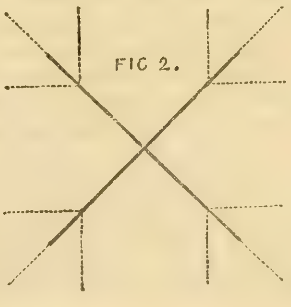


FIG 2.



ON FARM LEASES.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

The tenure by which the farmer holds his land has lately and beneficially engaged, the very general attention of the farmers' clubs throughout England. It is, in truth, a theme of the highest importance, even in a national point of view, and is one of whose just, politic, and equitable principles the landowner too commonly possesses only very limited information, and his legal agent generally still less.

In examining the covenants of such leases, it will be found that the principle is too often acted upon in a greater or a less degree, that it is politic to make the farmer stipulate to farm his land under one general, unvarying system—that he must not, in certain things, employ his own good sense; but in all cases, not especially provided for in his lease, cultivate his land according to the custom of the country, whether good, bad, or indifferent farming prevails.

By this covenant, if the farms of a district are *generally* under such a lease, it is evident, if *the covenant is ever strictly construed and complied with,* that no great improvement can possibly take place in the practice of farming. No valuable discovery can possibly, in such a case, be adopted, since it is certain that the first cultivator who breaks away from the custom of the country, in adopting a modern improvement, is legally committing a breach of the covenants of his lease. It would be better, I think, to rather substitute for "the custom of the country," the words "in a good and husbandlike manner;" and of this opinion was Lord Ellenborough, who, in giving judgment (*Legh* v. *Newett*, 4 *East*, 164), in a case involving a claim for a breach of covenant, observed, "*The custom of the country,* with reference to good husbandry, must be applied to the approved habits of husbandry in the neighbourhood under circumstances of a like nature; and perhaps a contract to occupy an estate in *a good and husbandlike manner* simply, would have imposed the same duty on a tenant, because the same sort of evidence, drawn from the approved practice of the country, would have been brought forward to show what was good husbandry." The custom or usage need not, however, be one followed from time immemorial: it is sufficient if there be a general usage. The practice of the country, and the good and correct feeling of English juries, it is true, causes generally substantial justice to be done to the farmer; but it is the true and wise object of all leases to avoid all causes of appeal to courts of law. Thus, even in a case where there was a written agreement, the court held that a custom of the district for the tenant to carry off the way-going crop might be enforced; for, as the great Lord Mansfield remarked in giving the judgment of the court,—"The custom is good—it is just; for he who sows ought to reap, and it is for the benefit and encouragement of agriculture. It is, indeed, against the general rule of law concerning emblements, which are not allowed to tenants who know when their term expires, because it is held to be their fault or folly to have sown when they knew their interest would expire before they could reap; but the custom of a place may rectify what would otherwise be imprudence or folly" (*Wigglesworth* v. *Dallison* 1 Douglas, 201).

Let, therefore, the contracting parties to a farm lease make it as clear, as brief, and as certain as they can; for uncertainty is ever the mother of contention and discomfort; but do not let them endeavour to contract to do more than is compatible with the steady, ever-altering circumstances and improving practice of agriculture.

Mr. Hewett Davis (himself a tenant-farmer), who as land-agent to very extensive estates, extending over a variety of soils, and in different counties, has adopted very reasonable general covenants, which I will give, making certain observations as I proceed. He says (Ag. Gaz., vol. 3, p. 394), when speaking of those leases, and their covenants, which he generally employs for arable farms:—

"1. *The Term.*—21 years—but determined by either bankruptcy, insolvency, nonpayment of rent, or breach of covenant.

"2. *Rent.*—Tenants to pay the rent QUARTERLY, and discharge all taxes, tithe, rates and impositions, except the land and the property taxes, which are allowed out of the rent. [The covenant to pay the rent quarterly does not oblige the landlord to *collect* the rent quarterly; he may still receive it when he pleases. It is stipulated to be paid quarterly, because, in case of nonpayment or other breach of covenant, it facilitates the necessary legal proceedings.]

"3. *Repairs.*—The tenant to do all repairs. Landlord to find timber, CUT OUT FOR CARPENTERS' USE. Tenant to cart, and pay for cutting out the timber. [The more common practice of allowing *rough* timber for repairs, is an unnecessary loss to the landlord, inasmuch as a large proportion of a marked tree is commonly unsuited to the tenant's use, and, therefore a loss to the landlord.]

"4. *Cropping.*—The land to be so cropped that, as near as can be, never more than three-fifths at once shall be cropped with corn, and that the remaining two-fifths shall be fallow, or under turnips, green tares, mixed grasses or clover, or roots for the feeding of stock; and that two cereal crops of corn shall never be grown in two successive years on the same ground.

"5. *Exchange for Manure.*—That for all hay, straw, roots, or fodder, green or dry, taken off the farm, double the quantity of animal excrement shall be returned; and the tenant, at Michaelmas of each year, shall furnish in writing an account of all that has been taken away, giving the dates, names, and addresses of the purchasers, and the quantities of each delivery, and of all the manure brought back, giving the dates, names, and addresses of the vendors, and the quantities purchased in return during the past year. [The legislature of England has, on more than one occasion, endeavoured to carry out the great object of all wise governments—the good progress of practical agriculture. Thus, by the 56 Geo. III. c. 50, sec. 1, it is enacted, that no sheriff or other officer shall sell or carry off from any lands, any straw, chaff, or turnips, or manure, in any case, nor any hay, or other produce, contrary to a covenant or written agreement. And, by a subsequent section of the same act, it is provided that the assignees of a bankrupt or insolvent shall not take any crop, or hay, straw, or manure, in any other way than the bankrupt would have been entitled to.]

"6. *General Covenants.*—The tenant shall maintain the land in a clean and husbandmanlike condition, preserve the timber and hedges from waste or injury; keep clean all ditches, watercourses, and drains; repair, and keep in good repair, all buildings, erections, gates, stiles, fences, and roads; and generally protect and uphold all rights and privileges attached to the farm.

"7. *Out-going Tenant.*—Shall leave all the hay, oats, and straw, of the last year's growth, save what may have been consumed on the premises, for the incoming tenant, to take by valuation at a feeding price. To be allowed, gratis, the use of the barns and stackyards, and all necessary convenience, for the purpose of threshing out the corn not taken by the in-coming tenant, and getting it to market, for six months after the expiration of his tenancy.

"8. *Game.*—To belong (except hares and rabbits) to the landlord.

"9. *The Landlord.*—To insure; to give quiet enjoyment; to pay the tenant at quitting (less all arrear of rent, rates, tithe, taxes, and other charges upon the farm up to Michaelmas-day) the amount of the appraisement which shall be due to him, according to the subject matters of the one paid at entering, the same to be ascertained by the time of quitting by two appraisers, or their umpire, who shall be nominated a month prior to the time of quitting; and in case either party shall neglect to appoint an appraiser (or an umpire in case of difference between the appraisers) then the valuation shall be made by the single appraiser, or the umpire nominated by one party."

It will be perceived that in this substance of a lease no provision is made for the allowance to the out-going tenant for his growing crops, tillage, or manure. This is omitted by Mr. Davis, from the conviction that these ought to belong to the *landlord,* and that in the more ordinary practice, the amount of these valuations add very materially and injuriously to the necessary capital of the farmer. I see very clearly the advantages of Mr. Davis's plan, in this respect, but I doubt its extensive applicability.

This form of lease will, perhaps, comprehend all that is essential and equitable both for the landlord and the tenant. The great mass of unnecessary, and never strictly observed, and even rarely understood covenants commonly introduced into farm leases, generally originate in the ignorance of the parties. The legislature has here again really shown its wisdom by giving a brief form of lease, which may, in the far greater majority of instances, with the addition of the substance of the nine different heads to which I have already referred, in the practice of Mr. Davis, be amply sufficient for the landlord's and tenant's security. The Act of the 8th and 9th Vic. c. 124, is entitled—"An Act to facilitate the Granting of certain Leases." It states that, "Whereas it is expedient to facilitate the leasing of lands and tenements: Be it therefore enacted, that whenever any party to any deed made according to the forms set forth in the first schedule to this act, or to any other deed which shall be expressed to be made in pursuance of this act, shall employ in such deed respectively any of the forms of words contained in Column I. of the Second Schedule hereto annexed, and distinguished by any number therein, such deed shall be taken to have the same effect and be construed as if such party had inserted in such deed the form of words contained in Column II. of the same schedule, and distinguished by the same number as is annexed to the form of words employed by such party; but it shall not be necessary in any such deed to insert any such number.

"II. That every such deed, unless any exception be specially made therein, shall be held and construed to include all outhouses, buildings, barns, stables, yards, gardens, cellars, ancient and other lights, paths, passages, ways, waters, watercourses, liberties, privileges, easements, profits, commodities, emoluments, hereditaments, and appurtenanees whatsoever, to the lands and tenements therein comprised belonging or in anywise appertaining."

The Act then gives the form of the entire lease, which is as follows:—

"This Indenture, made the day of one thousand eight hundred and forty- [*or other year*], in pursuance of an Act to facilitate the granting of certain leases, between [*here insert the names of the parties, and recitals, if any*] Witnesseth, that the said [*lessor*] or [*lessors*] doth or do demise unto the said [*lessee*] or [*lessees*], his [*or their*] executors, administrators, and assigns, all, &c. [*parcels*], from the day of for the term of thence ensuing, yielding therefore during the said term the rent of [*state the rent and mode of payment*]. In witness whereof the said parties hereto have hereunto set their hands and seals."

In such efforts to improve farm leases the landlords and the tenants of England are far too deeply interested to render it necessary for me to commend them to their earnest and often repeated study. It is true that by no form of words can landlords or tenants be made either honest or enlightened, but still you can facilitate the ejectment of an unprincipled tenant, as you may, in a great measure, prevent the oppression of a rapacious or an uninstructed landowner.*

ON THE SO-CALLED POTATO DISEASE.

BY CINCINNATUS.

"Well, David," said I to one of my Radnorshire labourers, "your neighbours, all that I have spoken to, say that their potatoes are bad, half of them rotten; how are yours, David?"

"Capital," said he.

"And have they kept well?"

"Beautiful"† he replied; "I never knew them keep better."

Now, all the cottagers of whom I had made this inquiry were squatters, having built cabins, and enclosed gardens for potatoes, on the same side of the same extensive common. They have the same soil; the same manures; ashes of turf and wood, in addition to compost, commendably collected during the year; the same kind of potato sets; all spade husbandry.

"How happens it that yours are good and theirs are bad? Can you account for it?"

David did not like to answer the question; but on my pressing for information, he said he was ashamed to own that it was entirely owing to his potato garden being so full of large weeds that a frosty night, which cut down the plants of his neighbours, did his no injury.

So much for Wales. Now for my farm on the bank of the Mersey. It is my constant practice to observe the various peculiarities of my labourers, and to select one, according to his strength and abilities, for each agricultural department. Thus, one man, not strong, but diligent and intelligent, trims all my fences and irrigates my meadows; another takes care of the roads and gravel-pits; a third sows, and manages the stack-yard; a fourth has charge of my potatoes—it is his duty to observe the progress of the crop from first to last, and to report any unexpected occurrence.

When my neighbours had made considerable progress in getting up potatoes, my potato man advised me to defer getting up mine, because the peels were tender, *as he expected* they would be, in consequence of a sharp frost which injured the plants, and the wet season which followed. We, therefore, got them up later than usual: still they were so very tender that we raised them with peculiar care, scarcely touching them with the forks; and, instead of throwing them together in heaps, as is usual, they were spread on the soil to dry until evening, when they were carefully collected, put gently into carts, and spread in outbuildings under cover until perfectly dry and the peel firm; then they were pitted in the usual manner; and they are now (19th June, 1846) perfectly sound and good. One of my neighbours, who invariably keeps his potatoes spread in outbuildings until they are perfectly dry before he pits them, assures me that his are perfectly sound.

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* Before the windows of the room in which I am now writing (Cumberland-place, Southampton), is a field of wheat which, absolutely white with the flowers of a profusion of weeds, affords an excellent illustration of the effects of a restricted tenure. The land can only be held in cultivation from Lady-day to Michaelmas; the gates are then taken off, and the cows and horses of the freemen of Southampton have free commonage (even if the crop, whatever it may be, is ungathered) until the 25th of March. To manure, therefore, or to fallow such a field is next to impossible. In the case of this year's crop, I am informed that the tenant ran all risks, ploughed the land, and sowed his wheat at Christmas; and although the freemens' cows and horses constantly pastured on his wheat until Lady-day, his crop is much more respectable than under such circumstances might have been reasonably expected.

† "Tidy" is, I think, the most general term expressive of excellence in the part of Wales bordering on Herefordshire; but "beautiful"—the very term he used—is also very commonly applied to every thing, however ugly, that is useful. Thus, a dose of nauseous physic, that gives relief, is beautiful; and a slovenly fellow, who does any kind act, is a tidy man; even a dirty slattern, who gives a cup of milk, is a tidy body.

These simple facts, corroborated by the *vivâ voce* testimony of practical men, the result of minute investigation, and in many cases of cross examination to elicit the whole truth, have fully satisfied *my* mind that the prevailing theory of disease in potatoes is just as illusive and unfounded as the recent fashionable discovery that potatoes are unwholesome. If any of these wise philosophers can invent a dinner more nutritious, more palatable, and more economical for a labourer with a numerous family, than a large dish of sound potatoes (the peels given to pigs), each cut into two or more pieces, with a little fat bacon or other meat, and a small portion of salt and pepper, it will make ample amends for the mischief they have done by creating a groundless panic and discouraging the growth of the most valuable of all vegetables.

It seems strange that men of education can commit such egregious blunders as the two above-mentioned. Had they possessed plain common sense* and common observation, they might have known, and they ought to have known, that the rind or peel of apples, pears, oranges, onions, &c., being injured, decays, becomes damp, and, if not checked by the removal of the damp, the whole is sure to rot—so it is with potatoes, and equally so with wheat, oats, or barley. Potatoes were checked in their growth by unseasonable frost; a cold, wet season again retarded their growth; so that, at the usual time of getting them up, they were, like corn in a cold, wet, season, unripe, and consequently seriously injured, being in a state of progressive decay. Give Irishmen employ, to enable them to purchase a little flesh-meat, and we shall hear no more nonsense about the disease or unwholesomeness of potatoes.

Another amusing specimen of humbug is the recent experiment, from high authority, intended to ascertain whether malt may in any way improve the growth or the fattening of cattle.

From the common saying, "That *one* swallow does not make a summer," it may be fairly inferred that two swallows do make a summer; and if two swallows make a summer, it follows, of course, that two oxen are abundantly sufficient to determine an agricultural principle of great national importance. This newly-discovered philosophical mode of procedure I read as follows:—"Take two oxen, regardless of their previous food, their state of growth, or their exact age; it is quite sufficient that, coupled like rabbits, one being heavy makes up for the deficiency of the other; and if one or both be diseased, if they loathe their food, if one eats hay the other straw, if from illness one or both lose weight, go on with the experiment of weighing them, but don't attend to the quantity of hay or straw they eat or waste; but for the benefit of sparrows and poultry be sure to give the barley and malt to the oxen dry and unground; publish to the world a tabular account of the weight of each ox from day to day; let it be well printed in a large blue book, embellished with an elegant engraving, exquisitely ornamented with all the colours of the rainbow, and an infinite variety of angular and wavy points, rivalling in beauty the tippets and collars in the *Magazine of Fashion;* and, as a climax, pronounce the verdict that, as food for cattle, barley is bad, and malt is worse." And so they are, if given injudiciously. But practical farmers know that barley, in various shapes, crushed or ground, or boiled or steamed, and mixed with other food, forms an excellent variety in the food of cattle; and that malt, even after extracting its saccharine and chief virtue by the process of brewing, not only increases the quantity of milk, but it also improves the condition of cattle. What a contrast to this pompous display of folly are the experiments in regard to sheep, amply, modestly, and judiciously given by a practical farmer in the "Agricultural Magazine" for May!

But the foregoing blunders of this speculative portion of the nineteenth century will do little harm, will soon pass into oblivion; not so the monstrous, Quixotic absurdity of Government. We have in Great Britain the best market in the world—it should be a good market, for it has cost a "mint of money"—and never was money better laid out. Taking the whole together as a joint-stock speculation, the national debt, vast as it is, and increased as it has been by numerous palpable follies since the death of Mr. Pitt, is a mere trifle when compared with the increased value of the property in Great Britain. Now this market not only has cost about seven hundred millions of money, but it also costs about forty millions a year to maintain it, to preserve it from destruction; and to this forty millions a year every individual in the kingdom, from the Queen to the beggar, contributes a portion. No British subject is allowed to sell even a lucifer-match or a potato without the payment of numerous taxes. And if this taxation was judiciously and impartially applied to all who bring or send their goods, wares, or merchandize to a British market, no honest or sensible person would complain. The fun of the joke is, that foreigners are ready and willing to pay whatever toll or tax we may impose upon their goods or produce, just as they charge tolls or taxes on British goods sent to their markets; but the wiseacres who now conduct the British government, frightened out of their wits by the activity of a despicable party of malcontents, relieve our bitterest enemies from their fair share of taxes, in order that John Bull may sink under the unequal pressure, and in order to add folly to injustice. The produce of our real friends, the Chinese, who receive British manufactures nearly free of duty, are most oppressively taxed; whilst the Americans, our open rivals and secret enemies, are to be comparatively free from taxation, with the exception only of tobacco. If it be unjust to tax food, all taxation is unjust; for not an article either of food or of manufacture, the produce of British industry, escapes taxation.

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* How just is the old adage: "Fine sense and exalted sense are not half so valuable as common sense."

DISTRESS FOR RENT.

TO THE EDITOR OF THE MARK LANE EXPRESS.

Sir,—In your valuable paper of this week I was much pleased to read an article headed "A Tenant League," and which recommends seven clauses or acts, most of which, if carried out, would be of infinite benefit to the farmer and tradesman; and if they would unite and persevere, their prospects are much brighter than the Anti-Corn-Law Leaguers had at their commencement.

As to the third clauses, relating to the landlord's prior claim to any other creditor; if this law had been altered twenty years ago, it most probably would have prevented the repeal of the corn laws, because landlords would then, for their own interests, let their farms to tenants who had sufficient capital, and not, as it has been so often the case, to accept tenants without sufficient capital (and merely for the sake of keeping up the old rent and being protected by the present law), consequently the land does not produce more than three-fourths of the produce it would do, and hence has arisen the necessity of foreign supplies. From the various trades I am engaged in, I am much interested in the welfare of the farmers, and have always considered them my best friends. I was sorry to differ with many of them in my opinion by refusing to sign the numerous petitions that were sent up from this county for protection to agriculture, because I considered it more a landlords' than a tenants' question; and had the latter devoted themselves to obtain tenants' rights, I think their time would have been more profitably employed. Sir Robert Peel has conferred a great boon upon the country by a repeal of the corn laws, and which eventually will lead to a repeal of the malt duty, and other obnoxious burthens on agriculture, and it will most probably induce landlords to be more attentive, and give to their improving tenants more encouragement and security for the investment of their capital. For the want of such security I have known many of the most respectable and best farmers in this county refrain from making those improvements they otherwise would have done. I cannot believe Sir Robert Peel would have consented to remain in the House of Commons to assist in carrying out other commercial reforms, if he had not the good of his country at heart, and more particularly so after having submitted to the most insolent and degrading language that ever fell from the lips of man.

Thos. Lister.

Broseley, Salop, July 2nd.

TITHE COMMUTATION.—The parliamentary returns presented by the Tithe Commissioners, of all agreements and of all awards for the commutation of tithes confirmed by them, as also of all apportionments confirmed from the 1st of July, 1845, to the 1st of January, 1846, have been printed. The first branch of the return has reference to the agreements confirmed by the commissioners in the half year mentioned, showing the amount of rent-charge agreed to be paid in lieu of tithes. By the summary it appears that the compositions and rates amounted to £6545 2s. 6¼d.; rent-charges, £7143 14s. 4d.; increase of rent-charges, £604 10s. 0¼d.; decrease of rent-charge, £5 18s. 2½d.; rent-charges for which compositions cannot be ascertained, £656 16s. 5d.; rent-charges of the present return, £7,800 10s. 9d.; rent-charges of former returns, £2,454,338 19s. 9½d.; total rent-charges, £2,462,139 10s. 6½d. The result shows that the total increase in the present return is £598 11s. 9¾d., and in former returns £56,542 5s. 5¾d.; making the total increase £57,140 17s. 3½d. The second branch contains a return of all awards for the commutation of tithes which have been confirmed in the period specified, specifying the amount of rent-charge awarded to be paid in lieu of tithes, and showing whether the same be payable to appropriators, impropriators, or clerical incumbents. The total rent-charges of this part amount to £61,196 0s. 11d.; and of former returns, £1,088,282 8s. 4½d., making the total rent-charges £1,149,478 9s. 3½d. The third part shows the apportionments confirmed by the Tithe Commissioners in the six months from July to January. The document extends to 22 pages.

THE BURTHENS ON LAND—THE MALT TAX.

We have already published the report of the Lords' committee on this subject. We find that Mr. Robert Baker, of Writtle; Mr. S. Jonas, of Ickleton, near Saffron Walden; and Mr. John Hudson, of Castleacre. were examined as to the effect of the malt tax.

Mr. Robert Baker examined:

You have stated that the present amount of malt duty, by checking the consumption, and depriving you of a fair market for your inferior qualities of barley, interferes with your rotation of crops; are you aware whether any alteration was made in the rotation of crops in this respect in consequence of the reduction of the beer duty, and the former malt duty, amounting to about 43s. a quarter?—No; I do not consider that there was, for this reason: the way in which it would allow me a better rotation of crops is, that I should grow barley upon those lands where I cannot grow it now, because it is not of the fine quality which is required for the London market.

Suppose the reduction which has already taken place to be double the amount of the present malt duty; if that reduction produced no effect in respect of the rotation of crops why do you suppose that the reduction of the remaining portion of the duty would produce a salutary effect upon agriculture? 23s. a quarter or 24s. operates as much against the introduction of inferior barley as the 52s. They only select the very finest barleys for the London markets: there are only two or three qualities selected for the London market.

Have you ever tried the boiling of barley for feeding purposes? I have known it used considerably for some feeding purposes. I do not know that it is improved by boiling more than by grinding.

You are aware that the law admits of the boiling, provided there is no kiln-drying process?—Yes, I am aware of that.

But you are obliged to give notice to the exciseman before you do that?—I believe we are.

Have you ever tried it?—I have never tried it to any extent; I have been always apprehensive of doing it. I knew that there were some restrictions; I did not know what; therefore, rather than run any risk, I did not try it. I have known instances where persons have been proceeded against, and have paid very severe penalties; and, therefore, without stopping to inquire why it was, I never made the attempt.

The interference of the excise materially affects your growing barley?—Certainly. We should use barley for our horses were it not for that. Steeped barley is good for our horses, but farmers are afraid of steeping it, lest they should trespass upon the law.

A reduction of the duty would not be enough, but it must be a total abolition?—Yes.

It is an interference with the due execution of your trade?—It becomes an interference with the comfort of the labouring man himself; our farmers would give beer to their men but for the duty.

Are you aware that animals will not masticate the steeped barley?—I am not aware that they will not.

Has the reduction which has already taken place in the duty on barley brought it within the reach and the consumption of the poor man?—No.

Is not that the reason why no sensible effect was produced in favour of the grower of barley upon the reduction of the tax, inasmuch as the tax still remained so high as not to permit the barley to be brought into consumption by the poorer classes?—I have looked rather closely into the question, and I consider that, under the present system, with the profit upon capital, there is 100 per cent. upon the duty; that the price is increased 100 per cent. in addition to the duty that is laid on in the first instance.

You say that the duty stands in the way of the grower of barley, but that benefit was not experienced from the great reduction that was made in the duty; was not that reduction, though great, still insufficient to bring the barley within the reach and the general consumption of the poor?—Quite insufficient. The price of beer was very little altered. I do nor think that the price of beer has been altered more than a halfpenny a pint from that reduction.

Who do you conceive get the amount of the three millions that was taken off from the malt duty?—The manufacturers, undoubtedly. The price of barley did not rise, or the price of beer fall, materially.

Do you think that if the malt duty was repealed there would be a greater consumption of beer in this country? In our district I think the consumption would be doubled.

If there was double the quantity of beer consumed, would it increase the price of barley?—Undoubtedly.

You do not think that the credit allowed by the excise to the maltster is any advantage to the grower?—I do not think it is, under the present system; but I think if the malt tax was abolished we should have abundance of men who would not require that relief, and who would be able to manufacture it at less than it is now manufactured for.

Is not the quantity of barley that is used for malting purposes limited by the excise regulations?—Undoubtedly. If the duty were abolished, I think 50 per cent. more would be sold for malting purposes.

Does not the present system reduce the price of barley?—It makes, to my knowledge, from 10s. to 11s. a quarter difference. I sold barley on Friday last at 35s. 6d., and barley of the same weight which would make good beer would be 26s.

Mr. Samuel Jonas—I consider the malt duty to increase our expenses in this way: we find our men with beer for harvest work, and ale occasionally the remainder of the year, and small beer at all times. This, upon one farm in my occupation of 1,037 acres, amounts to about twenty-five quarters of malt, the duty upon which amounts to about 27*l.* 1s. 8d., which, on 1,037 acres, is 6¼d. per acre. The parish is of a very poor description of soil, and is farmed upon the four-course system. Our turnips are consumed on the land to produce the barley or oat crop, and our seeds are consumed by sheep to produce the crop of wheat, so that each crop will have two years' expenses upon it; and therefore I have charged two years' expenses upon the wheat crop, and two years' expenses upon the barley and oat crop, which amount to 12s. 2½d. per acre. And I will state how much it comes to per quarter upon my produce. I have occupied this farm only two years; I have had only one year's crop finished up, of which I know the produce. I have taken that one year's crop, because I know the amount per acre grown, and I have taken four years' average of the crop of my predecessor; the farm was carried on as a partnership concern, and therefore that is fair evidence of the actual produce made. The average crop, deducting seed, was three quarters of wheat per acre, four quarters and one bushel per acre of barley, and five quarters and seven bushels of oats per acre. I have put them at four quarters of barley and six quarters for oats. Therefore this crop of wheat of three quarters per acre is enhanced in price, by the burdens I have mentioned, to the extent of 4s. 0¾d. per quarter, which comes to 12s. 2¼d. for the three quarters. The price of the four quarters of barley is increased 3s. 0½d. per quarter by those burdens, making 12s. 2d.; the six quarters of oats per acre are enhanced 2s. 0½d. per quarter by those burdens, making 12s. 2d. I have another calculation here of the amount of tithe paid in this parish, and the burden which this creates per acre upon the produce of that land. The tithe of this parish was commuted, and a rent-charge fixed, of 1,017*l.* 10s. per annum, calculated upon the following quantities of corn: Wheat, 966 bushels, 17,211 parts; barley, 1,733 bushels, 68,432 parts; oats, 2,466 bushels, fractional parts 66,660. The price of wheat at that time was 7s. 0¼d. per bushel; barley, 3s. 11½d.; oats, 2s. 9d. The total rent-charge was 1,017*l.* 10s., which sum on 3,132 acres, amounts to 6s. 5¾d. per acre; and this for two years, as before, amounts to 12s. 11½d. per acre. Therefore the price of wheat is enhanced 4s. 3¾d. per quarter, the price of barley is enhanced 3s. 2¾d. per quarter, and the price of oats is enhanced 2s. 2d. per quarter by the burden of tithe.

Afterwards he was asked—

Do you think that, generally speaking, the malt tax discourages the growth of barley, and that it would be increased if the malt tax was reduced?—There can be no question of it.

Is it not the fact, that a bushel of barley would make a bushel of malt?—It would make more than that. From the swelling of the grain there is always an increase in the manufacture of malt. I am concerned in a large business at Bury St. Edmund's as a maltster, so that I know it is a fact.

If the malt tax were taken off, what would probably be produced from a bushel of malt?—I recollect my father saying that he has heard his father say he knew the time when they used to carry a coomb of barley to the maltster, and a shilling, and have back a coomb of malt.

They got a coomb of malt for a coomb of barley, and paid 1s.?—Yes; there was the increase upon the malt and the shilling for the maltster.

Mr. Hudson's examination and evidence ran as follows:

You are occupying a farm at present?—I am.

In what county?—Norfolk.

What is the nature of the soil of the farm?—Various.

And the subsoil also?—Yes; some clay and some chalk; and it is various on the surface. In fact I have scarcely a field but what has two or three different soils.

What is the number of acres that you occupy?—1,500 acres.

You are in the habit of purchasing a great quantity of oilcake every year?—Yes.

How much?—I purchase a great quantity for manure, but principally for feeding cattle. I have ascertained that it has answered my purpose till lately to feed my cattle and sheep with a considerable quantity of linseed-cake, by which means I have been able to increase the produce of my farm; but I fear that I shall be obliged to give it up now, in consequence of the proposed free trade tariff.

What have you spent in one year upon oilcake?—More than 2,000*l.*

Near what town is your farm?—Near Swaffham.

What is your system of cultivation?—The whole of it is upon the four-course system.

Are you prepared to state the amount of rates which you pay?—The rates for the last seven years have averaged about 4s. 6d. per acre. Those are the poor rate, the highway rate (which is very trifling), the church rate, and the county rate.

The highway rate is separate from the poor rate?—Yes.

The county rate is taken out of the poor rate?—Yes.

And the police rate?—That is paid out of the poor rate.

Are your bridge rates paid out of the county rate?—We have not any; but they would be if we had any.

Do you employ more labour on your land than is absolutely necessary for the cultivation of the land, in order to prevent any persons being thrown upon the parish or the rates?—Yes.

To a considerable extent?—Yes. I do not like them to be on the roads. In fact, since the alterations of the poor law, we have had very little idleness on the roads. Previously to the alteration of the poor law, we used to have from fifteen to twenty men upon the roads, but since the alteration of the poor law the farmers have abolished that system. Occupying, as I do, half the parish, I have thought it to be an advantage to employ the surplus labourers rather than that they should be on the roads.

But this is supernumerary labour?—Yes.

Then in addition to the absolute sum which the farmers pay in the way of poor rate, do you consider that this employment of additional labourers ought to be taken in calculation?—Yes, I do.

What is your rent ?—About 22s. an acre.

Do you pay tithe ?—No ; I hire the land tithe free.

Do you grow much barley ?—About three hundred acres of barley every year.

Do you consider that the malt duty in any way interferes with you as a farmer in the growth of barley ?—Very materially.

Are you prepared to state to the committee how you consider the malt duty interferes with you as a grower of barley ?—If I was allowed to use inferior barleys I should convert them into malt for the purpose of feeding my cattle. I grow about 3,000 coombs or half quarters of barley in the year ; and I should myself consume half my produce, were I allowed to make it into malt without paying duty for it.

And you consider, therefore, contrary to the opinion of certain learned professors, that malted barley is good for purposes of fattening ?—I do ; I know that it is.

You speak from experience as to its good effects ?—Yes.

Do you consider that if the malt duty were removed the demand for barley would be considerably increased for all purposes ?—Very much indeed.

Do you also consider that, on certain soils, barley could be substituted for wheat in the cultivation of the land ?—That would very much depend on the price of wheat. If wheat recedes in price, the land which would be calculated for barley, and which land had been forced into wheat cultivation in consequence of the remunerating prices of wheat some years ago, would, in my opinion, revert to barley cultivation ; that is, in case the price of wheat becomes low.

Therefore the farmer would suffer particularly on those lands. As the duty would fall upon the barley it would constantly interefere with him in regard to his cultivation ?—Yes.

Do you allow your labourers beer ?—No ; we give them money.

Do you mean to say that you give them an allowance in lieu of beer ?—No ; the wages are paid entirely in money.

Do you give them an allowance of beer in hay-time or harvest ?—Sometimes.

Can you state how much an acre you consider the malt duty affects arable land ?—I have made no calculation of how much per acre it would be ; I know pretty well how much it would affect my cattle per head. If I might be allowed to use coarse barley made into malt without paying any duty, I consider that it would be a saving of from 2*l*. 10s. to 2*l*. 12s. a head in feeding a beast. I think it would be better than barley by 2*l*. 12s., and better than cake by 2*l*. 10s.

Do you mean by barley sprouted barley ?—No ; barley-meal. I do not think sprouted barley is fit for bullocks. We are allowed to use sprouted barley. I have been keeping fifty cart horses throughout the winter upon sprouted barley, and we have done it for years.

Have you tried sprouted barley in fattening bullocks ?—Yes, I have. I think it is apt to turn sour. Bullocks are dainty ; if it is a day or two old it will not do for them. It will not be alike at all times, but the malt will always be alike.

In the present mode in which you fatten bullocks upon cake or beans, is there a profit ?—Not upon the beasts, if you lay all the expense of the oilcake upon the animal.

Where is the profit ?—It is in the manure.

But with the 2*l*. 12s. given you from the malt you would be able to turn something upon the beasts ?—Yes. Now we lose from 30s. to 40s. per head upon the beasts if we put all the oilcake upon the animals.

Though you have your land tithe free, does your landlord pay tithe ?—Yes, the vicarial tithe.

You stated that you thought it would save you, if you were allowed to use malt, 2*l*. 12s. per head in the fattening of cattle ; will you have the goodness to give the committee the figures upon which you come to that conclusion ? Give the present mode of fattening, and the expense of that, and the manner in which you think that 2*l*. 12s. per head would be saved ?—I think a peck of malt is equal to fourteen pounds of linseedcake. A beast will consume in twenty-three weeks five quarters of malt ; that is a peck a day.

Why do you take twenty-three weeks as the stanard ?—That is the time that it would take to consume five quarters of malt.

Is it the time that would be required to fatten a beast upon the average ?—Yes ; that is about the time that the beast would be in the yard.

What do you reckon the malt a quarter ?—I have reckoned my coarse barley at 24s. a quarter, the coarse barley that we want to use. We do not want to interfere with the best malting barleys ; but in every farm there is a quantity of coarse barley that will not do for the maltster.

Then you put the five quarters of malt at 6*l*. ?—Yes, and 2s. per qr. for the malting. With the duty I consider it would cost 12*l*.

For what do you consider that five quarters of malt to be a substitute ?—A substitute for a ton of linseedcake.

What do you pay for a ton of linseedcake ?—9*l*. a ton for foreign cake ; British cake, 10*l*. or 11*l*. a ton.

With the duty on, fattening on malt would cost 12*l*. to 9*l*. on linseedcake ; with the duty off you consider that that 9*l*. would be reduced to 6*l*. 10s. ?—Yes.

That is the mode in which you calculate the saving of 2*l*. 10s. or 2*l*. 12s. ?—It is. I consider that five quarters of malt are equal to seven quarters of barley. I believe that practice and theory—I will not say science—are at variance upon this point. I should like to back my opinion by a bet of 100*l*. with the great chemist, if he will test his theory against my practice. I would back 50 to 100 bullocks fattened upon malt against Dr. Playfair's 50 or 100 bullocks fattened upon barley, either wetted or ground barley.

You have no doubt in the world that malt is a great deal better than sprouted barley for fattening beasts ?—None.

In the proportion of five to seven ?—Yes ; I should have no objection that he should take seven quarters and I would take five.

Do you not think that giving malt to beasts promotes their health, and also makes them fatten much more quickly ?—It is very much better for them ; it is sweet, and they are particularly fond of it. I believe, if you happen to have a horse that has had the influenza, you will not get him up with any thing else so quickly as with malt, even with only a quarter of a peck a day.

So that, altogether, you consider that the malt duty very seriously interferes with you as a farmer?—Very materially.

When you state the result of your practical experience to be, that it would be 2*l.* 12s. in favour of malt as against barley, and that it would be 2*l.* 10s. in favour of malt as against linseedcake, do the animals fatten more quickly upon malt or upon barley?—Upon the malt, certainly.

Do they fatten more quickly upon malt than they do upon linseedcake?—Yes; and their flesh is of a better quality—very much better for the consumer.

Does it not produce this effect upon the animals, that it gives a proper proportion of lean and fat to them?—Yes; and it is generally known, more especially by cooks, that the fat of an oilcake-fed beast, when roasted, goes a good deal into the dripping-pan, but not if it be a malt-fed beast.

Have you proved that by any experiment?—I know how the beast was fed, and how it ate when it was killed.

Do you find that a butcher will pay more for a beast fed upon malt than upon oilcake?—Yes. It will be a better colour: it will not be of an oily nature.

Will there be any considerable difference in the quality of the manure from the malt-fed animal as compared to the linseedcake-fed animal?—No, I think not.

Do you mean to say that you have tried it extensively, feeding animals upon malt?—I once fed twenty bullocks with it.

Notwithstanding the duty on malt?—It was barley that got wet in the fields. Some years ago the wet interfered with the harvest, and the barley became very much sprouted in the field; it was sent to the kiln to be kiln-dried, and it became perfect malt. The cattle that I fed with it fattened exceedingly well.

You sometimes use malt-dust as manure?—Yes, I have used it.

You use it especially for growing barley, do you not?—No; I have used it for turnips.

Have you been able to form any comparison between a field manured by malt-dust and a field manured by the dung of your fattening beast?—No; I generally mix my manures; I muck the whole of my land for turnips; the more the manures are mixed the better.

Do you find that the malt duty interferes with the second and third qualities of barley?—Certainly. We find no market for the second and third class qualities, nor can we use it to the best advantage on our farms.

STRATFORD-ON-AVON FARMERS' CLUB.

The July Meeting of this Society was held on the 3rd instant at the Town Hall. Darwin Galton, Esq., Edstone Hall, president, in the chair. A paper was read to the members by Chandos Wren Hoskyns, Esq., Wroxhall Abbey, near Warwick, on "The Rights and Privileges of Landlords and Tenants." Mr. Hoskyns commenced by tracing, historically, the gradual changes and growth of this relation from the period of the feudal ages down to more recent times, when the introduction of an improving system of agriculture, and more especially the cultivation of fallow crops intended for winter consumption, had produced a gradual revolution over the whole system of agriculture, and the necessity for a more expensive establishment, and larger investment of capital in the cultivation of land. He shewed that the extension of trade, and the rapid increase of population, by creating an enormously increased demand, had stimulated invention and improvement, and by this means added so greatly to the acreable produce, that, in spite of the advancing demand, the produce had been sufficient not only to meet but to overtake it, as was evinced by the gradual lowering of the price of corn, not from any foreign source, but as the natural consequence of the application of capital on a larger scale to the soil. The necessity for this capital in the hands of the tenant occasions a just and reasonable ground for that security for its investment, which can only be efficiently given by a lease. He objected to the term of leases of 7, 14, and 21 years, originally suggested by the peculiar nature of church and corporate property, and approved of the more rational periods which were regulated by the courses of modern husbandry, and so fixed as to include a certain number of courses, greater in proportion to the state of the farm on entering, and the consequent outlay of capital required on the part of the tenant. He considered that, in the hands of an intelligent occupier, the covenants and stipulations of a lease should be as simple as possible, and confined chiefly to the reciprocal protection of the parties on its termination, and during the few years previous. He stated that nothing would conduce more to the advantage of the tenant than the keeping of a regular system of accounts, according to the practice of the Example Farm at Whitfield, together with other celebrated f such as that of Mr. Huxtable, in Somersetshire, Mr. Mechi, in Essex, and Mr. Hewitt Davies, in Surrey, all of which he cited as exemplifying the almost unlimited capability of increased produce from land not before considered of a good quality, and with evidently profitable returns for the outlay, both on the part of landlord and tenant. Another point to which he directed attention was the want of regular agricultural statistics, instancing those collected with perfect accuracy by the Government, in the case of hops, as a proof of the feasibility of collecting them; whilst none is required of the advantage that would accrue to agriculturists, and to those who had the task of legislation upon the subject of agriculture. "I trust," said Mr. H. in conclusion, "that the brief remarks which I have drawn together may, as the subject becomes better understood, as I believe it now bids fair to be, through many causes that never were in more active operation than at the present moment—that my observations may be found to coincide with the conclusions to which advancing intelligence and confirmed experience are every day directing our minds; and that, as I heartily believe, all those causes will conspire more than ever to promote that cordial understanding and right good feeling which nowhere exhibits itself in the English character more warmly than in the mutual and important interests which are bound up in the relation of landlord and tenant."

ON THE NECESSITY OF AN IMPROVED SYSTEM OF AGRICULTURAL EDUCATION.

Sir,—In the present posture of agricultural affairs in this country, a few observations on the necessity of a more extended education for the agriculturist may not be out of place.

Leaving to your talented and powerful pen the advocacy of those social rights of the farmer, included under the comprehensive head of "TENANT RIGHTS," I shall endeavour in this letter to show that the general education of the farmer is not adapted to the present times; and that it is deficient in all those elements of power, which alone can enable the agriculturist successfully to cope with the competition to which he will inevitably be exposed.

Though there are many honourable exceptions, yet the generality of farmers are contented if the education of their children shall enable them simply to read, write, and cypher; these *operations* having constituted the staple of the education of the parents themselves. Not one in a hundred thinks that these very studies, though good enough to begin with, are only the means whereby we may acquire an education, and that they do not constitute the education itself. Reading and writing enable us to extend our knowledge, they are new senses given to us. But what would be the use of reading, if not to obtain knowledge? what the use of writing, if not to convey truths, information, and advice? These means, therefore, to an end, ought not to be taken at more than their proper value, but ought to be estimated in proportion as they give us the power to extend further our researches into the nature of those objects which exist around us. But when do we, in general, find in the education of the agriculturist one particle of information respecting the nature of the soils he works upon, its composition, its chemical and mechanical properties? Where do we find that the nature and constitution of the vegetable kingdom occupy the agricultural mind? How often, and when is inculcated, the necessary conditions for ensuring health in domestic animals, or the effects of different kinds of food on the animal frame and constitution?

While, however, it is a matter of lamentation that neither in the education of the young farmer, nor in the practice of the old, is a systematic knowledge of nature brought to bear for the production of his crops, let us turn to the manufacturers, and observe whether they have been equally remiss, or whether a grand lesson may not be learnt from the mode in which the manufacturers have conducted their business, and the vast results they have obtained. Have they been equally with the farmer neglectors of scientific improvements?

On referring to the history of the arts and manufactures of this country for the last half century, we find that there is scarcely a single business which has not received transcendant benefits from the application of mechanical science and chemistry. Irrespective of the discoveries of Watt and Arkwright, the application of chemistry to many operations in the arts is the foundation of the great superiority possessed by the manufacturers of this country over those of her neighbours. In the process of bleaching, for example, the application of a simple chemical discovery produced the greatest revolution that can well be imagined. It was discovered that a substance called *chlorine* (contained in chloride of lime) possessed the property of bleaching vegetable colours in a few minutes. The celebrated Professor Cepland, of Aberdeen, proposed to use chlorine for the bleaching of linen and cotton goods; after meeting with the amount of opposition which new discoveries usually encounter, the new process was universally adopted. By the old method, the goods required from eight to ten months to bleach: they are now bleached in a day. This discovery lies at the foundation of the prosperity of the calico printing and manufactures of this country. If the old method had yet to be pursued, it would be impossible to print one hundreth part of the calico now printed, and the price would be indefinitely augmented. The advantages of these improved processes are no doubt well estimated by the ladies, who can obtain printed dresses *far cheaper and better* now than even twenty years since.

In the metallurgic art the use of chemistry has also been great. New ores of metals have been discovered, old *slags* have been remelted, and made to furnish an additional quantity of metal; and methods have been discovered of obtaining metal from ores which previously had resisted all the old processes.

Dyeing, tanning, sugar refining, and a thousand other operations have received immense aid from chemistry, and show by their present prosperous condition the value of the assistance so rendered.

How many are there now living who remember the ridicule which was at first excited by the proposal to light the streets and shops by the chemists' "philosophical candle?" and yet now the lighting by gas has extended from one extremity of the civilized world to the other; and poor indeed is the town, or even large village, which has not its gas manufactory. And shall the farmer be the only one who shall refuse to avail himself of benefits open to all? Is it possible that he will any longer refrain from making himself acquainted with the truths of science, that he may apply these truths with success to the cultivation of the soil? I think not, for even the few improvements introduced into the art of farming have already been productive of immense benefit, and sufficiently show what we might expect from their more extended application.

It has been well observed by Liebig, "that from science alone further improvements in agriculture are to be expected." And indeed to those who compare the present state of agriculture with that of our ancestors, the vast aid given by chemical and mechanical means to the amelioration and better cultivation of the soil will be readily apparent. These improvements, and the practical skill of the British farmer, have placed him far in advance of the cultivators of the soil in any part of the world. But if he would retain the proud position he has gained, he must not in our days of *railway* progression, rest satisfied with his *present* superiority. He must continue to avail himself of all that science can suggest and practice perform; and above all, he must see that his yet youthful successors are well and early instructed in the principles of science and of chemistry.

Agriculture is a science as well as an art, and must depend for its successful pursuit, not only upon the information to be acquired by a practical pursuit of the subject, but likewise upon the knowledge of the structure, functions, and properties of vegetables; upon the knowledge of the different geological strata of different districts; of the various mineral ingredients of each of these strata, together with a thorough acquaintance with the substances required for the nutrition of plants. The information required cannot be obtained without the study of botany, geology, and chemistry.

It might be objected that the farmer has no time, engaged as he is on his farm, to study these sciences. Though this observation may have some little force, yet, even with the farmer, time might easily be found for mental improvement. If less time were spent upon noisy dogs and dangerous guns, mental opportunities would speedily increase.

But my object is chiefly to show the necessity of educating the young agriculturist in a suitable manner, and to prove that all the objections to a study of science in boyhood are utterly futile.

In the education of youth destined for agriculture, botany, geology, and chemistry ought to form a prominent part; a *thorough* knowledge should be given of the nature of all the chemical elements which occur in the soil, in the air, in water, and in the animal and vegetable kingdoms in general; practical instructions should be given, in properly and conveniently constructed laboratories, in the various methods of analyzing minerals, soils, and manures; and the methods of detecting and weighing every thing removed by the crops should be perfectly known.

We often hear persons unacquainted with the proper mode of teaching chemical science, object, that it is impossible to cause young persons to acquire that practical knowledge of analysis, which shall enable to detect and to ascertain *by weight*, the various ingredients in crops, manures, guanos, &c. We wholly differ with these persons, because we have in our laboratories practically proved the contrary. Many of our youths have performed analyses of various substances with an accuracy which would not disgrace *men* of double their age. Many of these analyses have been already published in various journals, and give the best evidence of the advancement of these young chemical students. In confirmation of these remarks, I subjoin the following *original* analyses, selected from many others, performed by one or two of our pupils in the Session from January to June, 1845. It must be observed, that these youths had likewise to attend to their studies of the mathematics, classics, and modern languages.

I.—*Analysis of the inorganic matter of farm-yard manure.*

	Farm Yard Manure from Kent.	Farm Yard Manure from Surrey.
Per centage of Ash	9.2	9.6
Silica	79.79	71.32
Potash	3.32	5.14
Soda	0.92	1.68
Lime	6.90	12.32
Magnesia	0.56	0.82
Common Salt	1.43	1.22
Phosphate of Iron	2.04	2.03
Phosphate of Alumina	1.53	2.54
Sulphuric Acid	1.89	1.57
Phosphoric Acid	1.58	1.27
Manganese	a trace.	
ALLEN AND GREENHILL.	99.96	99.91

II.—*Analysis of two samples of guano.*

	Peruvian Guano.	Ichaboe Guano.
Moisture	15.50	25.50
Ammonia	12.85	9.60
Organic Matter	38.95	32.40
INORGANIC MATTER.		
Silica	1.30	.44
Potash	3.21	4.19
Soda	.48	.34
Chloride of Sodium	2.03	1.61
Lime	17.81	11.55
Magnesia	.39	.83
Phosphate of Iron	.65	.48
Sulphuric Acid	.42	1.06
Phosphoric Acid	6.38	11.83
ALLEN.	99.97	99.83

III.—*Analysis of peat and wood ashes from Farnham.*

	Peat Ashes.	Wood Ashes.
Silica	5.50	4.25
Sand	46.10	10.00
Charcoal	16.85	.35
Lime	5.35	29.05
Magnesia	.10	6.65
Potash	..	7.55
Soda	..	4.89
Chloride of Sodium	.40	.80
Chloride of Potassium	.60	..
Sulphuric Acid	3.25	3.25
Phosphoric Acid	.60	4.70
Carbonic Acid	2.50	25.00
Phosphate of Iron	..	2,50
Oxide of Iron	13.50	..
Phosphate of Alumina	..	.50
Alumina	4.40	..
Manganese	..	a trace
ALLEN.	99.15	99.40

The proof of the possibility, therefore, of giving chemical knowledge to boys is perfect; and in addition, I have always observed that the effect on youth of an early inculcation of scientific truths, is to enlarge their minds and quicken their perceptive faculties.

No one, I think, will be rash enough to deny that if a youth, thus prepared by a scientific education, be set to learn farming with a first-rate practical man, he will, when he has to commence the world for himself, be far more likely to succeed in the good management of his farm, the preparation of his manures, and the fattening of his cattle, than the *merely practical* man who cannot give a reason for a single operation which takes place on his farm.

I have been induced to trouble you with these observations from having remarked that many persons really have a most indistinct idea of what chemistry, if acquired, is capable of performing; while others really believe it is an almost superhuman task for either man or boy to master the hard words, and obtain even a smattering of science. I trust I have shown to unprejudiced minds the fallacy of both these suppositions, and I feel assured that by means of a good scientific education the great cause of agricultural improvement will best be supported and enforced.

In conclusion allow me to recommend to agriculturists desirous of self improvement the perusal of "Liebig's Letters on Chemistry;" Professor Low's "Practical Agriculture;" Professor Johnstone's "Lectures on Agricultural Chemistry and Geology;" Thaers' "Principles of Agriculture," translated by Shaw and Johnson; and, as a book for the hands of young children, Johnson's "English Rural Spelling Book."

I am, Sir, your obedient servant,

J. C. NESBIT.

Agricultural and Scientific Academy,
Kennington Lane, London, July 1st, 1846.

MR. JONAS WEBB'S TUP SHOW.

The twentieth annual show of pure Southdown tups, the property of Mr. Jonas Webb, was held at Babraham, in Cambridgeshire, on Thursday, July 9.

The show took place, as usual, in a field adjoining the residence of Mr. Webb, where the tups were arranged so as to afford the public an opportunity of inspecting them conveniently.

In this part of the country there had not been more than a slight shower or two for two months. On the morning of the show the rain fell in very heavy showers, and in consequence of this hardly-to-be-called-unfortunate circumstance, the letting was delayed some considerable time beyond the usual hour of commencing business. When the day cleared, this delay proved to have assisted in exciting a very considerable competition. Mr. E. Smith officiated as auctioneer, and, fearing another shower, the sheep were called out as fast as they could be knocked down for upwards of an hour.

The company present at the letting was one of the most influential and respectable we ever witnessed, not only at Babraham, but at any place, under any circumstances. There was but one universal expression and admiration of the show of Thursday last. The most eminent agriculturists and breeders were unanimous in declaring this to be the best exhibition, as to the quality of the stock shown, ever offered to public inspection by Mr. Webb. This gentleman evidently feels that he must progress, and that to remain stationary or to retrograde would quickly lose him that high position he has already attained amongst English breeders and agriculturists. Amongst the company present were the agents of various noblemen, agriculturists, and breeders from every county in the kingdom, all desirous of availing themselves of the advantages to be derived from Mr. Webb's flock. This fact cannot fail to be looked upon as very strongly in favour of the Southdown breed, and practically proves that this breed, unlike most others, is not adapted to any particular county or locality, but is as profitable for the bleak north as for the fertile plains of Sussex.

The highest priced tup let was one hired by the Earl of Leicester for 50 guineas for the season. At and after dinner several sheep were let at higher prices than were obtained at the letting. The usual number (120) of rams were placed on the ground, and before dinner about 60 were let an average of £16 or thereabouts per head. In most instances the tups were let at prices considerably above those affixed as the reserved sums by Mr. Webb. On the whole, we are glad to find that this year's letting was as satisfactory to Mr. Webb as any of its predecessors. We observed that the sheep adapted for farmers generally had prices much lower than ordinarily affixed to them, in order to meet the present state of things.

After the sale the company adjourned to partake of a dinner, served up in the style of old English hospitality, for which Mr. Webb has long been celebrated.

THE DINNER.

At five o'clock about 250 noblemen, gentlemen, and agriculturists sat down to an excellent dinner, in a capacious building adjoining Mr. J. Webb's new house, which was very tastefully decorated with bouquets and evergreens.

After the usual loyal and constitutional toasts had been given and responded to,

The CHAIRMAN called on Viscount Torrington, to propose the health of the Lord-Lieutenant of the county, the Earl of Hardwicke.

The noble VISCOUNT said he had never experienced so much pleasure as in witnessing the show of that day, and that he regarded Mr. Webb as the first farmer in his department in England, and a man who, by his high talent and perseverance in the production of sheep, his moral worth, and unbounded hospitality, was entitled to the respect and admiration of his countrymen (cheers). He did not believe it would be possible for Mr. Webb to surpass in any future years the stock they had witnessed to-day. With respect to the object of his toast, he need say nothing, the noble Lord the Lieutenant of the county being so well known among them. No better friend to the agricultural interest breathed than Earl Hardwicke; and he hoped he would long live to be an honour and supporter of that body. The noble Viscount thanked Mr. Webb for his liberal hospitality.

Lord **Suffield** rose to propose the next toast, "The Bishop and Clergy of the Diocese, in connexion with the name of the Hon. and Rev. E. Yorke," who briefly returned thanks. The noble lord concurred in the expression of admiration of Mr. Webb's show, and of thankfulness of the hospitality displayed towards him uttered by the preceding noble speaker. It had been his fate from childhood to live among the yeomanry of this kingdom, and men of that stamp; for, if he were convinced of one thing more than another, it was that the closer the tie were drawn between the yeomanry and the landlords, the better it would be for both classes, and for the general community. He should be very happy to see Mr. Webb at Norfolk, and he would endeavour to show him a set of as good farmers and good fellows as ever existed. If he (Lord Suffield) did not come to Babraham another year, it would be for the want of an invitation.

The **Chairman** gave "The Health of Mr. Webb, and Success to the Babraham Flock." To such perfection had Mr. Webb brought the Southdown breed, that he had heard a doubt hinted as to whether there was not some portion of the Leicester breed in Mr. W.'s sheep, it being supposed by many that true symmetry could alone be found in that class of animal. But Mr. Webb's flock was *Southdown*, and *Southdown* alone. They also found that, on the present occasion, the Earl of Leicester was the hirer of the best tup let—a fact which spoke for itself as to the estimation in which this flock was held by the son of him who had done more than any one to improve the breed of sheep.

Mr. J. **Webb** was received, as usual, with loud cheering; he thanked them most heartily for the kindness so constantly evinced towards him. A noble lord, who was obliged to leave for town, had doubted whether his sheep were capable of any improvement; he (Mr. Webb) would certainly endeavour to improve them, whether he succeeded or not (*hear, hear*). Another noble lord had told them that the more landlords were respected by their tenantry, the better it would be for both classes. What, he (Mr. Webb) would ask, would be the utility of such meetings as these, if landlords did not come amongst them, to countenance by their presence, and to hire their sheep? He had also endeavoured to fix the price of the sheep let to farmers at very low prices indeed (*hear, hear*). An allusion had been made as to the possibility of his flock having a portion of Leicester blood in them; he was one of those who thought there could be but one right formation for all animals, and on examining the Leicester breed, beautiful as it was in many respects, he came to the conclusion that they could not do better than a good Southdown sheep. The Leicesters wanted a little better neck; to have better legs of mutton, and more lean meat with the fat. And as he knew they liked plenty of lean meat with the fat (*hear, hear*), if it were not taking up too much of their time, he could tell them what had taken place in his own experience relative to the different qualities of mutton. He had fully expected to have seen Lord Ducie here to-day; and he would have been here, had he not, as Mr. W. believed, been suffering from a severe attack of gout. Now he (Mr. W) was a brother sufferer, and his landlord, who was invariably very kind to him, advised him to go to Dr. Chambers, who was very eminent for his treatment of that painful disease. He went, and the doctor asked him a great many questions, told him he had too quick a digestion, and that he must be particularly careful what he ate and drank. He (Mr. W.) said he *was so*: he never drank a drop of ale, or spirits, or anything of the kind. The doctor said, "Come to me again in a fortnight, and I think, if you attend to my directions, I can put you all to rights. But," added the doctor, "you must be equally particular as to what you eat; you must eat *nothing but mutton* (*laughter*)! And," continued the doctor, "don't be gulled into the belief that the best mutton you can eat is the fine old Welsh mutton, recommended by so many people; that is hard indigestible stuff, fit neither for your stomach nor mine; and if you eat the nasty, coarse, white-faced sort, you may as well eat so many pounds of beef: the only kind you must eat is the very best Southdown mutton (*laughter*). This is far more nutritious, and much more easy of digestion than any other sort." The doctor also added to his prescription a very agreeable recommendation, that he (Mr. W.) should drink half-a-pint of sherry per day. To this regimen he had attended ever since, and from that day to the present had never experienced an attack of the gout. From the absence of the noble lord (Ducie) he feared he was suffering acutely from it; if he were present he would venture to offer him the same advice as he once gave another noble lord, when suffering under that painful malady, viz., to persevere in the remedy which had been so successful with him (*cheers*). He wished not to speak despairingly of the real merits of the white-faced breed; a high-bred Leicester was a beautiful animal, and admirably adapted to home purposes, but not to be compared to Southdowns, as to the quality of the meat; this he thought would be generally admitted, as they all liked plenty of lean with the fat. One remark, in conclusion, as to any admixture of other blood. This flock had now been before the public nearly twenty-two years, and his sheep had been constantly exposed, not only on one day, but every day throughout the year, to any gentleman: every ram he had ever used had been seen. How, then, could it be supposed he had ever used any admixture of Leicester blood in his flock? He thought this was the best possible proof that he had never crossed with a Leicester sheep. He begged to thank them for the compliment paid him, and for their liberality on this and all other occasions.

Mr. St. **Quentin** proposed the health of the chairman, which was very ably acknowledged by Mr. Pym, who, at its termination, proposed "Prosperity to the Royal Agricultural Society, and success to Mr. Webb at Newcastle." Whilst on this subject, allow him to allude to a circumstance which had much vexed him. He saw in London last week a list of the members who had not paid their subscriptions to the Royal Society, and he wished he could say that Cambridgeshire stood lowest in the scale. The frequent changes amongst members of the university has tended probably to produce this to some extent; he should, however, feel very much obliged if the men of Cambridgeshire would stir up their neighbours, and tell them that in the number of the Journal next after the meeting a list of every defaulter will be published.

Captain **Cotton** proposed the health of the hirer of the highest priced tup, the Earl of Leicester.

Mr. **Kerry**, the Earl of Leicester's agent, acknowledged the toast. He had not, as he heard since he came into the room, hired the highest priced tup, inasmuch as Mr. Webb had, since the show, let the sire of the one he had hired for the noble earl for the same sum for the season. His noble employer was aware of the defects which existed in the Leicester sheep, and felt that the best thing he could do to eradicate them would be to hire of Mr. Webb, in order to improve his flock *(cheers)*.

The **Chairman** introduced Mr. Colman, from the United States, to propose the next toast—a gentleman who had been travelling in England for upwards of two years, in order to obtain information on the subject of British agriculture.

Mr. **Colman**, after alluding to the happy conclusion to which the rumoured war between England and America has been brought, said he had witnessed with much pleasure the improvements which science and art, combined with great practical knowledge, had enabled an individual to effect in one department of agriculture. He had seen the Lincolnshire sheep, weighing 70lbs. to the quarter; he had seen the Dorsetshire sheep, giving two lambs per year; he had seen the Cheviot sheep of Scotland, and further north, an admirable and profitable animal; he had seen the Leicester sheep, staggering under their own weight, and waddling oppressed from their excessive fatness; but, in point of symmetry, weight, quality of wool, hardness of constitution, and general profitableness to the farmer, he had seen none which equalled Mr. Webb's Southdowns *(loud cheers)*. Now-a-days, they heard much of uniting science with practice. He meant no disrespect to science when he said that science was not confined to mere mechanical rules, or mere book knowledge. What was science—what was wisdom—but knowledge gathered from reading, from experience, from observation? And it was by the practical application of this information that all theories must be tested. Though he honoured science, he honoured practice still more. He had no objection to theories (he was, indeed, interested in theories), but he preferred the results of practical experiments, and would give more for Mr. John Hudson's opinion of the use of malt in fattening cattle, than for all the theories in Christendom; and he had more respect for the opinion of Mr. Jonas Webb on improving the breed of sheep, than for all the physiological knowledge of his most respected friend Professor Playfair, who, being a most respectable old bachelor, had probably never been engaged in breeding at all (*laughter*). He was aware that certain subjects were considered as prohibited at this meeting, but whilst he would on no account trespass on this rule, he supposed that facts might be spoken, and those things referred to which were by law established. He had heard of a philosopher so exceedingly wrapped up in his studies, that when his maid-servant went to him in great hurry and exclaimed "Sir, the house is on fire!" replied, "Go and tell your mistress, for I have nothing to do with *family* affairs!" He (Mr. C.) did not know that they had anything to do with the affairs of government; but if the house were on fire, they must at least take care of themselves; and since government had seen fit to take its hands from under their arms, and dismiss them from leading-strings; since it had seen fit to throw them overboard, and take from them the last fragment of a plank, they must either go ashore or perish (*cheers*). He trusted there were still resources enough in the English farmer to keep him afloat, and that they might reach the shore in triumph by their own native energy. He had been delighted to witness the improvements made in agriculture in different parts of England, and he held that that which had been done might be done, and that no man was justified in stopping short of that standard of excellence which had been attained: he had had great pleasure in witnessing their improvements, and said "go on!" Mr. Colman said he should as long as he lived deeply feel the kindness and hospitality he had met with in England; they were separated by a wide ocean—wide they once called it, but every day brought it nearer and nearer to them, and he believed that in six months they would be within six days' distance from each other. Why, then, should they not come home (*loud applause*)? Why should they not be drawn together? The same language was common to both—the same blood: their free institutions were from the free inspirations of liberty which first heaved in British hearts, and God grant that the two great nations of the earth might soon learn to scorn those miserable and irritating feuds which were calculated to stir up and increase the bad blood which had so long existed in the hearts of the nations towards each. He hoped the time was fast coming when the words of the noble lord who had just retired from the Secretaryship of Foreign Affairs might be indelibly stamped on every heart, when war should be considered as unchristian, and under all circumstances a crime. Mr. Colman proposed the health of their hostess, Mrs. Webb.

Mr. **Bewsher** proposed the Magistracy of the county of Cambridge, and coupled with the toast the Rev. Mr. Acton, who acknowledged it.

"The Strangers who have honoured us with their company to-day."

Rev. Mr. **Lucy**, of Lucy, Warwickshire, replied. He had that day succeeded in hiring a most beautiful animal, and he hoped it would have the effect of inducing others to come here on future occasions, and follow his example.

Amongst the remaining toasts proposed were "The Army and Navy," acknowledged by Captain Cotton; "Mr. Webb, Sen.;" and "The Hon. Mrs. Adeane," (by Mr. Hammond); and "Mr. Jonas, of Ickleton," by Mr. Colman; after which the company dispersed.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

A Weekly Council was held at the Society's house in Hanover-square, on Wednesday, the 24th of June. Present: The Right Hon. Lord Portman, President, in the chair; Duke of Richmond; Earl Spencer; Earl of Lovelace; Viscount Newry and Morne; Hon. G. C. Agar; Sir Charles Lemon, Bart., M.P.; Sir John V. B. Johnstone, Bart., M.P.; Sir John Ogilvy, Bart.; T. Raymond Barker, Esq.; John Benett, Esq., M.P.; S. Bennett, Esq.; Henry Blanshard, Esq.; W. R. Browne, Esq.; Colonel Challoner; John Cotes, Esq.; H. Gibbs, Esq.; W. H. Hyett, Esq.; S. Jonas, Esq.; John Kinder, Esq.; Colonel MacDouall; W. Miles, Esq., M.P.; R. Milward, Esq.; E. A. Sanford, Esq.; Professor Sewell; W. Shaw, Esq.; John Villiers Shelley, Esq.; G. Turner, Esq.; J. Baines, Esq.; H. Blacket, Esq.; T. B. B. Browne, Esq.; Dr. Calvert; C. G. Cotes, Esq.; T. Dunne, jun., Esq.; J. B. Glegg, Esq.; T. M. Goodlake, Esq.; J. Greene, Esq.; Algernon Greville, Esq.; Rev. James Linton; E. Parkyns, Esq.; E. Poole, Esq.; S. Solly, Esq.; E. Tull, Esq.; T. Turner, Esq.; and T. R. Tweed, Esq.

The following communications were received:—

1. Six specimens of the sheet-iron baskets used for ordinary purposes on Mr. Hudson's farm, at Castleacre, in Norfolk: presented by Mr. Fisher Hobbs, to whom the Council ordered their best thanks to be conveyed for his kind attention to their wishes on this point.

2. A specimen of a glass milk-pan, weighing 15lbs., and manufactured at the rate of 8d. per lb.: from Messrs. Edwards and Pell, to whom the thanks of the Council were also given for this present.

3. Results of the communication into which Mr. W. R. Browne, at the request of the Council, had placed himself with Mr. William Browne, of Winterbourne Stoke, on the subject of his employment of cut straw for litter. The Council appointed Mr. Benett, M.P., and Mr. W. R. Browne, to be a committee for the purpose of paying a visit to Winterbourne Stoke, and reporting to the Monthly Council in November next the result of their personal inspection of Mr. Browne's plan, and its advantages.

4. A communication from Mr. Parker, of Sweeney Hall, near Oswestry, on the subject of a new barometer of his invention, preparing by him for the purpose of presentation to the Society.

5. A statement from Mr. Stott, of Bristol, on the advantages of employing charcoal obtained from refuse tan as a cheap vehicle for the mechanical suspension and distribution of concentrated animal manure.

6. Specimens of wheat grown in Shropshire and Yorkshire, presented respectively by Mr. Wigley and Mr. Blacket. An interesting discussion followed the presentation of these specimens, in the course of which many important facts connected with the cultivation of wheat on different soils and under different circumstances, were communicated on the personal experience of the members present, and several valuable suggestions made for carrying out future experiments on that subject.

The President reported to the Council, that he had communicated with the Secretary of State on the subject of the grant of a certain number of the metropolitan detective police force at Newcastle, for the purpose of guarding the members attending the ensuing Country Meeting in that town from the depredations of the swell mob, and that Sir James Graham had given instructions that every attention should be paid to the application of the Society.

The Members of Council and Governors present then proceeded to the business of the Special Council: Lord Portman, President, in the Chair. Reports were received from Earl Spencer, on the part of the General Newcastle and Judges' Committees, and from Mr. Shelley, on that of the Committee for the selection of the Trial-ground at Northampton, and the Council, having despatched the miscellaneous business brought before them connected with the ensuing Country Meeting, proceeded, on the motion of the Duke of Richmond, to pass an unanimous vote of thanks to the Committee of the Exchange and News Rooms at Newcastle, for their liberality in throwing open those rooms to the free access of Members of the Society during the period of their visit to that town.

The Council stands adjourned to Wednesday, the 1st of July.

A Monthly Council was held at the Society's House in Hanover-square, on Wednesday last, the 1st of July. The following Members of Council and Governors were present:—Sir Francis Lawley, Bart.; Hon. R. H. Clive, M.P.; Sir Matthew White Ridley, Bart.; Sir Charles Lemon, Bart., M.P.; Sir John V. B. Johnstone, Bart.; Sir Robert Price, Bart., M.P.; Colonel Austen, M.P.; Thomas Raymond Barker, Esq.; John Benett, Esq., M.P.; S. Bennett, Esq.; H. Blanshard, Esq.; Colonel Challoner; F. C. Cherry, Esq.; S. Druce, Esq.; H. Gibbs, Esq.; B. Gibbs, Esq.; W. H. Hyett, Esq.; J. Kinder, Esq.; R. Milward, Esq.; E. A. Sanford, Esq.; Professor Sewell; W. Shaw, Esq.; J. V. Shelley, Esq.; and C. Hampden Turner, Esq.

Finances.—Colonel Austen, M.P., Chairman of the Finance Committee, laid before the Council the Special Report of that Committe on the Arrears of Subscription, and the Monthly Report of the Accounts of the Society to the 30th of June. The former contained a statement of the various steps undertaken and in progress, under the direction of the Committee, to facilitate the payment of the annual subscriptions as they become due, and to regulate the expenditure in reference to the current income, with a recommendation that a list of all members in arrear should be drawn out and published in the next part of the Journal of the Society. The latter announced the invested capital of the Society as standing at £7,000 stock, with a current cash-balance of £2,568 in the hands of the Bankers. These reports, and the recommendations which they contained, were unanimously approved and adopted by the Council. The Chairman then read a letter received from the Treasurer of the Local Committee at Newcastle, in which it was stated that the sum of £1,000 as a subscription from the Northern District towards the expenses of the ensuing country Meeting had been placed to the credit, and at the disposal of the Society.

On the motion of Mr. Shelley it was resolved: "That the Finance Committee be recommended to employ the Union Collectors in the county of Sussex, and in such other counties as they may deem expedient, for the collection of the arrears of subscription."

Mr. Milward laid before the Council two letters addressed to him by parties in Nottinghamshire, on the subject of the arrears of their subscriptions. These communications were referred to the Finance Committee, with special instructions.

Police.—The President transmitted to the Council a letter addressed to him by the Right Hon. Sir James Graham, one of Her Majesty's Principal Secretaries of State, in reply to the application his lordship had made to him, on the part of the Society, for the grant of the usual amount of detective Police Force at the Newcastle Meeting, in which communication Sir James Graham informed the President that he had given directions for the assistance of the required number of such Police for the use of the Society. The Council ordered a vote of their best thanks to be transmitted to Sir James Graham for this communication.

Glass Pans and Pipes.—Sir John William Lubbock, Bart., one of the Life-Members of the Society, having obtained, through the liberality of Captain Stanley Carr, a certain number of the German glass milk-pans, referred to by him in his Paper on the Rural Economy of Schleswig, Holstein, and Lauenburg, published in the first volume of the Society's Journal (page 380), both for his own use and for presentation in Captain Carr's name to the Council, had induced Mr. Pellatt, of the Falcon Glass Works, Blackfriars, to undertake the manufacture of these utensils for sale in this country; and that gentleman having from time to time announced to the Council his progress in reducing the price of the glass-pans, and improving their manufacture, at this Meeting informed the Council that he had been enabled to effect a still further reduction in the price of pans similar in size, but stronger in body than those previously presented by him to the Society, namely, that he could now manufacture the pans at 3s. each in green glass, or of any size at the rate of 5d. per lb. in green, and 7d. per lb. in the best white flint glass. Mr. Pellatt further stated, that it was his intention to attend, as a member of the Society, the next weekly meeting of the Council, for the purpose of communicating to the Members a statement of his process of casting glass pipes for conducting water or other liquids.

The Council having finally ratified the Report of the Judge's Committee, and nominated the parties (whose official duties precluded them from inspecting the exhibition in the show-yards on the Thursday) who should have the privilege of admission on the evening of the Wednesday after the judges had completed their awards, then adjourned to the Weekly Meeting on the 8th instant.

A weekly Council was held at the Society's house Hanover-square, on Wednesday, the 8th of July, present, the Right Hon. Lord Portman, President, in the chair; Duke of Richmond; Hon. R. Henry Clive, M.P.; Right Hon. W. Bingham Baring, M.P.; Sir Hungerford Hoskyns, Bart.; Sir Charles Lemon, Bart., M.P.; Sir John V. B. Johnstone, Bart., M.P.; Sir Robert Price, Bart., M.P.; T. Raymond Barker, Esq.; Rev. T. Cator; Colonel Challoner; F. C. Cherry, Esq.; J. J. Farquharson, Esq.; H. Gibbs, Esq.; W. Fisher Hobbs, Esq.; John Hudson, Esq.; John Kinder, Esq.; Colonel Mac Douall; F. Pym, Esq.; E. A. Sanford, Esq.; Professor Sewell; W. R. C. Stansfield, Esq., M.P.; J. Baines, Esq.; Dr. Calvert; W. A. Commerell, Esq.; C. Cure, Esq.; H. J. Farquharson, Esq.; A. Ogilvie, Esq.; E. Parkyns, Esq.; T. Turner, Esq.; and T. R. Tweed, Esq.

Hybridized Wheat.—The Hon. R. H. Clive, M.P., laid before the Council a communication with which he had been favoured by Dr. Lindley, in reference to a decisive result obtained by Mr. Maund, of Bromsgrove, Worcestershire (the well-known editor of a periodical work entitled the *Botanic Garden*), by crossing Egyptian cone with an English red wheat, and thus producing a beardless wheat: for "although," as Dr. Lindley observes, "there is not at present any proof of what the *quality* of this cross may be, yet it shows that corn is as open to improvement as any other plant; and that I take to be a highly important fact. All such attempts deserve encouragement; and if the Royal Agricultural Society were to take up this matter in good earnest, and to offer such prizes as will induce intelligent men with the necessary leisure and opportunity to give it their serious attention, important results might be obtained."

Mr. Clive then introduced Mr. Maund to the President and Council, when that gentleman exhibited the various specimens of wheat connected with his experiments, and detailed the progress of his operations in effecting the cross in question, between different kinds of wheat, for the purpose of producing the artificial fertilization required. These specimens exhibited the varieties between the Oxford red and the Donna Maria white wheat; as well as those between the Egyptian cone and the Oxford red. In the produce of the latter cross some of the ears had awns, while others were without them. Mr. Maund stated that the new varieties thus obtained in his experiments appeared to possess great luxuriance and promise of fertility. He thought it not unlikely that eventually not only any given external character intermediate between those of the wheats selected for the occasion may be obtained, but that the chemical nature of the grain may be favourably influenced for any given purpose required.

The President, on the part of the Council, having then expressed to Mr. Maund the thanks which the Council, on the motion of the Duke of Richmond, seconded by Sir Robert Price, had voted to him for his attention in submitting to them his interesting and valuable results, requested that he would prepare for the Journal Committee, in the course of the autumn, a detailed statement of his experiments and their results, including not only a reference to the scientific circumstances of the fact as connected with the laws of vegetable physiology, or the changes produced in the chemical constitution of the plant, but also to the more homely, but not less important result of the practical value of his products as obtained by the miller and the baker.

Water Elevator.—Dr. Spurgin, of Guildford-street, Russell-square, presented to the Council a working model of a machine invented for the purpose of raising water out of shallow cavities in land, and applying it in a continuous stream for any required object. Dr. Spurgin, in submitting this invention to the notice of the members, remarks: "I have long thought it to be very desirable to have a cheap, simple, and efficient machine for raising water *only a few feet*, for the purposes of irrigation: it is to be expected that in those countries where irrigation has been practised from time immemorial, such contrivances would be resorted to as are most suitable; and, accordingly, we find the circular woollen belt among the number. A few weeks back I heard of the plan which the model I have submitted to you is intended to represent, and which is in use in some private gardens at the Cape of Good Hope. I had this model constructed accordingly for the use of the Polytechnic Institution; and, in order to make the plan more generally known, I thought, by submitting it to the inspection of the members of the Royal Agricultural Society, its value for farming and other purposes might be soon ascertained. One of the objections to the revolving belt has been the necessity for its being made to travel around a wheel or cylinder at the bottom as well as at the top; whereas, it is now proved that the lower wheel can be dispensed with altogether. The velocity also requisite to impart sufficient momentum to the water for carrying it over the wheel, and shooting it off from thence into a trough or pipe, is by this plan greatly reduced, whilst the momentum is unnecessary, for the little wheel which rolls and presses upon the ascending side of the belt checks the upward progress of the water, and causes it to fly off into the trough at the required height; and further, the necessary velocity may be obtained either by a multiplying wheel, or by having the belt traversing on a single wheel of a large diameter, say from 5 to 7 feet or more, whilst the width and length of the belt may vary according to circumstances. For my own part I am certain that large quantities of water may be raised from ponds, streams, or reservoirs, for divers agricultural processes, at a very small cost; and that the produce of our meadow-lands may be increased by the employment of this simple but effective apparatus." Dr. Spurgin's machine consists of a woollen belt, dipping below into the liquid, and compressed or wrung out above by means of a small wheel pressing it closely to the rim of the greater wheel on which it revolves: while the water so intercepted and pressed out is received by an open conduit, and flows along in a continued stream. The Council ordered their thanks to be given to Dr. Spurgin for his attention in presenting this model to the Society.

Miscellaneous Communications.—The following communications were also laid before the Council:—

1.—A complete set of Swinborne's Farming account books, adapted for the use of the several grades of persons employed in agricultural affairs. Presented by Mr. Fisher Hobbs, and referred to the Farming Account Committee.

2.—A statement from Mr. Saul, of Garstang, of his invention for watering turnips.

3.—A letter from Mr. Pellatt on the subject of his further reduction in the price of glass milk-pans, and on that of the application of glass to the purposes of skylights, roofing, and water-pipes.

4.—A suggestion from Mr. Rowlandson, of Liverpool, whether, instead of an inspector of manures, the employment of a broker might not be the best mode of preventing the purchase of adulterated artificial manures.

5.—Papers from Mr. Coxworthy on ventilation, &c., addressed to the Duke of Richmond.

6.—A communication from Mr. Newberry, on the cultivation of wheat, addressed to the President.

The President having then adverted to the attention paid to the Society by the Lord Mayor, of London in the communication with which his lordship had honoured Lord Portman, as President of the Society the Members of Council and Governors present proceeded to the business of the Special Council, the President in the chair.

Mr. Handley.—The President having called the attention of the Council to the great loss the Society had sustained in the death of their trustee, Mr. Handley, the Duke of Richmond feelingly dwelt on those circumstances of Mr. Handley's connexion with the Society from its earliest organization to within a few days of his decease, which had gained for him the undivided respect of every member of the Society, and would connect his name with its history to the latest period of its existence. His Grace referred particularly to Mr. Handley's letter addressed to the late Earl Spencer, previously to the formation of the Society, and which had so materially prepared the way for its establishment by the simple but striking effect with which the advantages of such an association for objects so truly national were advocated by its now lamented author. He alluded to the zeal and energy with which Mr. Handley had devoted himself to the duties of the presidency during his year of office, and that of the Bristol meeting, and to his indefatigable exertions in the cause of the Society, both in his capacity of trustee and as member of the Journal Committee, as well as on every other occasion requiring his valuable aid. "No man," said his Grace, "ever more zealously performed his duty than Mr. Handley; and his death is an irreparable loss to his family and to all of us."

On the motion of the Duke of Richmond, seconded by Colonel Challoner, the President was requested to address a letter of condolence, in the name of the Council, to the Hon. Mrs. Handley, on the occasion of her bereavement. The President remarked, that anything more gratifying than the manner in which their late colleague and friend had devoted himself to the interests of the Society could not well be imagined; and he undertook with a melancholy satisfaction the duty of endeavouring to convey to his afflicted family an expression of that high estimate which they all, then present, in common with every other member of the Society, entertained of deep respect for his memory.

The following elections were then made :—

On the motion of Mr. Raymond Barker, seconded by Colonel Challoner, Lord Portman was unanimously elected one of the Trustees of the Society.

On the motion of the Duke of Richmond, seconded by Mr. Fisher Hobbs, the Earl of Hardwicke was unanimously elected one of the Vice-Presidents of the Society.

Mr. Pym was unanimously elected one of the Stewards of the Cattle-yard at Newcastle, and the name of Mr. Fisher Hobbs added to the list of the Farming Account Committee.

The Secretary laid before the Council the contract into which he had entered in their name, and agreeably with the arrangements of the General Newcastle Committee, with Mr. Haigh, of the Assembly Rooms, Newcastle-upon-Tyne, for the supply of the Pavilion Dinner for 1,200 persons.

Mr. Brandreth Gibbs, Director of the Show, reported from Newcastle the satisfactory progress of the arrangements for the Society's ensuing Country Meeting and Exhibition of Stock and Implements.

Communications were received from Mr. Merryweather, of Long Acre, respecting the exhibition of the powers of his great fire-engine at Newcastle, before the Mayor and Corporation; and from Mr. Crofton, of Holywell, respecting the sale and exhibition of his stock.

The Special Council then adjourned to the Music Hall, Newcastle-on-Tyne, on Tuesday next, at two o'clock.

The Weekly Council then adjourned to the 29th instant, in London.

NEW MEMBERS.

Adams, Thomas, Albion-terrace, South Shields
Allen, John, Willington, Newcastle-upon-Tyne
Allhusen, Christian, Elswick House, Newcastle-on-Tyne
Allsop, Thomas, Ridge-green, Reigate, Surrey
Annandale, Peter, Shotley-grove, Newcastle-on-Tyne
Archbold, John, Riffington, Berwick-on-Tweed
Barkus, William, sen., Coxhoe, Durham
Barnes, John Stagg, Middleton-in-Teesdale, Durham
Bertram, Charles (J.P.), Gateshead
Bigge, Matthew Robert, Sheriff of Newcastle-upon-Tyne
Binks, Christopher, Friars Goose House, Gateshead
Bird, Rev. Christopher, Chollerton, Hexham
Blackwood, William, Saintfield, County Down, Ireland
Blenkensop, John, Slake House, South Shields
Brakenridge, John, Bretton Park, Wakefield
Briggs, Rawdon, Birstwith Hall, Harrowgate
Brown, Isaac, Cowpen Lodge, Blyth, Northumberland
Burn, Richard, Orton Hall, Penrith
Chambers, George, High-green, Sheffield
Clephan, James, Gateshead, Durham
Clinton, Colonel, 66, Eaton-place, London
Clinton, Major, 6, Audley-square, London
Cook, William, Catraw, Stannington, Morpeth
Cooke, William, Camerton Hall, Workington, Cumberland
Cookson, Charles Edward, Newcastle-upon-Tyne
Cookson, Isaac Thomas, Newbiggin House, Newcastle-upon-Tyne
Cooper, Thomas H., Lecturer on Botany, Agricultural School, Hoddesdon
Crawhall, Joseph, Newcastle-on-Tyne
Cummins, Thomas, Mayor of Gateshead
Davidson, A. A. Greaves, Hylton-grove, West Boldon, Gateshead
Day, John Woodhouse, Pelaw House, Durham
Dent, John, Streatlam Castle, Durham
Dent, Ralph, Streatlam Castle, Barnard Castle, Durham
Dobson, Thomas, Eldon-street, Newcastle-upon-Tyne
Dodd, T. A., Woodhouse, Ryton, Durham
Embleton, Robert, Embleton, Alnwick
Featherstonhaugh, Walker, Hermitage, Chester-le-street
Forster, John, Shafto, Cambo, Morpeth
Forsyth, Thomas, South Shields, Durham
Greenwell, Wm. Thomas, Greenwell Ford, Durham
Greville, Fulke S., North Mimms Park, Herts.
Hawthorn, William, Benwell Cottage, Newcastle-upon-Tyne
Headlam, Morley, Wycliffe Rectory, Greta-bridge
Headlam, Ven. Archdeacon, Wycliffe Rectory, Greta-bridge
Houseman, John, M.D., Barras-bridge, Newcastle-on-Tyne
Hovill, J. R., Soham, Cambridgeshire
Humble, William John, Northumberland-street, Newcastle-upon-Tyne
Hutchinson, John, Low Waskerley Farm, Shotley-bridge, Durham
James, Thomas, Otterburn Tower, Newcastle-upon-Tyne
Liddell, Henry George, Eslington House, Whittingham
Linzee, Robert G., Hampton Lodge, Farnham, Surrey
Markham, Rev. Rice, Morland, Penrith
Marshall, William, Westoe, South Shields
Matthews, R. W., Beamish, Gateshead
Maynard, J. C., Harlsey Hall, Northallerton, Yorkshire
Mellor, John, Queen-square, Newcastle-on-Tyne
Morton, W. J. T., Lecturer on Chemistry, Royal Veterinary College
Nethercoat, John, Moulton Grange, Northampton
Newby, Henry, Hall Garth, Durham
Nicholson, John, Shotley-bridge, Durham
Orde, Rev. Leonard Shafto, Alnwick
Orde, Charles William, Nunnykirk, Morpeth
Parker, Samuel Walker, Newcastle-on-Tyne
Petre, Hon. Frederick, Writtle Park Farm, Essex
Powles, Thomas William, Hurworth, Darlington
Pugh, William Buckley, Pattrington, Hull
Ravenshaw, Rev. Edward, West Kington, Rectory, Chippenham
Richardson, Thomas, Newcastle-upon-Tyne

Robson, Joseph, Gateshead Park, Gateshead
Rogers, Francis (E.I.C.S.), Douglas, Isle of Man
Ruddock, John, Oakerland, Hexham
Southern, Geo. William, Kibblesworth, Gateshead
Standish, W. Standish, Duxbury Park, Chorley, Lancashire
Stephens, John Moore, Winscott, Torrington, Devon
Stott, Robert, Tanfield, Gateshead
Surtees, Robert Lambton, Redworth, Darlington
Taylor, John Parker, Treeton, Rotherham
Tower, Colonel Henry, Elamore Hall, Durham
Turner, John, Thorpe, Perrow, Bedale
Viner, Henry, Newby Hall, Ripon, Yorkshire
Wakley, James, Newcastle-on-Tyne
Watson, John, Burnopfield, Gateshead
Wilson, Robert, South Shields
Wilson, Ashley Henry, The Abbey, Wigton, Cumberland
Wilson, Ralph, Grey-street, Newcastle-on-Tyne
Wood, Nicholas, Killingworth, Newcastle-on-Tyne

CHELMSFORD WOOL FAIR.

This fair was held on Tuesday, July 2. The quantity of wool was rather below that of last year, the number of fleeces in 1845 being 11,114, and the number brought to the scale 3,840, weighing 157 cwt. 3 qrs. 3 lbs. This year there were 10,777 fleeces, being 337 below that of the previous year, and the total brought to the scale 4,181, weighing 195 cwt. 0 qrs. 17 lbs. The buyers present were—Messrs. Johns, Unwin, Bell, Legge, C. Legge, Wells, Stock, and Scotcher; and the average prices of the day were as follow: Half-bred hoggets, 15d.; down hoggets, 14d. to 14½d.; ewes, 12d.; Kent hoggets, 14d.; Kent ewes and wethers, 12d. In two instances higher prices than these were given, but these were exceptions to the ordinary run of wools, being lots of a well known and very superior quality.

THE DINNER.

At three o'clock, about 70 gentlemen sat down in the Assembly Room, at the Saracen's Head Inn, to a most excellent dinner, provided by Mr. Sylvester, in a style of taste and plenty which gave much satisfaction. J. Oxley Parker, Esq., took the chair; and amongst those present were—C. T. Tower, W. Tuffnell, T. Brewitt, and W. Fisher Hobbs, Esqrs.; Messrs. Matson, Legge, sen., C. Legge, Harrison, George Matson, T. Johns, W. Johns, C. Bell, George Clarke, J. Scotcher, E. Fulford, H. Joslin, J. G. Fenn, S. Unwin, jun., — Hollingsworth, — Stock, William Hutley, Thomas Phillips, A. H. Matson, — Knight, — Gale, C. Gale, W. Shepherd, — Malden, — Tippler, — Turvill, W. Benson, D. Hockley, W. Meeson, — Arnold, — Burder, — Grove, W. Steele, D. Polley, — Baker, C. Carter, W. Clarke, — Bushell, — Coleman, J. Malden, jun., — Stock, T. Durrant, &c. After the cloth had been removed, and the loyal toasts had been drunk, the Chairman, after some preliminary remarks, stated that the quantity of wool offered—

	cwts.	qr.	lbs.
Weighed at scales in 1846, 4,181 fleeces ..	195	0	17
in 1845, 3,840 " ..	157	3	3
Increase, 341	37	1	14

Samples in 1845	7274
1846	6596
Decrease	678

He then requested the gentlemen would commence business, and gave "The Health of the Buyers."

After some desultory conversation, and some vain attempts to sell, the Chairman gave "The Colchester Wool Fair," and coupled with it the name of W. F. Hobbs.

Mr. W. Fisher Hobbs said he had always been an advocate and supporter of this fair from its commencement, and he was happy to join in their meeting on this occasion to ascertain the feeling of the buyers and sellers.

After some other toasts were given and responded to, The Chairman said, as many of their friends had drawn off probably to do business in the market-house, he would now retire; and the company accordingly broke up.

The following were the purchases made by the principal buyers:—

Messrs. W. and T. Johns.—Sir John Tyrell, Bart., 160 Down hogget and 110 half-bred ditto, 15d.; 142 ewe and wether, 13d. Messrs. W. and H. Marriage, 60 hoggets, 15d.; 95 ewe, 12d.; Mr. James Christy, jun., 193 Down hoggets, 14d. Mrs. Corder, 50 teg, 14d.; 24 ewe, 12d. Mr. Impey, Broomfield, 71 teg, 15d.; 70 ewe, 12d. Mr. Perry, Writtle, 160 ewe, 12d.; 8 teg, 15d.; Mr. J. Reeve, 170 ewe, 12d.; 10 teg, 15d. Mr. S. Reeve, 100 ewe, 12d. J. Coverdale, Esq., 50 mixed, ewe and teg, 13d.; Mr. G. Bridges, 100 hogget, 15d.; 84 ewe, 12d. Mr. Cameron, 20 hogget; 40 ditto. Mr. Porter, Shenfield, 100 half-bred ewe, 12½d., 90 ditto ewe, 12d. Mr. Barnard, Hockley, 113 half-bred hogget, 15d. Mr. Clarke, Rawreth, 260 Kent and half-bred hogget, 14d.; 140 Kent and Down ewe, 13d. Mr. Humphry, Blackmore, 330 ewe, 12d.; 40 hogget, 14d. Mr. John Marriage, sen., 55 teg, 15d.; 100 ewe, 12d. Mr. Heywood, 180 ewe, 12d. Mr. Clarke, Cuxley, 210 mixed, 13½d. Mr. Tipler, 66 teg, 14d.; 72 Welsh, 10½d.; Mr. Joice, 240 teg and 30 ewe, 14d. Mr. Norrington, 30 hogget, 14¼d. Mr. Ratcliff, 60 mixed hogget, 14d.; Mr. Phillips, 60 Down hogget, 14½d.

Mr. S. Unwin.—T. W. Bramston, Esq., 139 hoggets, 16d.; 410 ewes and wethers, 13d. J. O. Parker, Esq., 455 Down ewes and wethers, 486 Down hoggets, 100 Kent ewes, and 100 hoggets, 16d. and 13d. Mr. James Christy, 180 half-bred hoggets, 15d.; 100 ewes, 12d. Mr. G. Carter, 270 Down hoggets, 15d.; 300 ewes, 12d. Mr. Hart, 200 Down and Leicester hoggets, 15d.; 180 Down ewes, 12d. Mr. Wm. Baker, 300

Down hoggets, 14½d. Mr. Catchpool, 260 Down and half-Leicester hoggets, 15d.

Mr. Wells.—Mr. Hart, Mashbury, 45 ewes and 50 hoggets. Mr. Rust, Good Easter, 106 ewes and 128 hoggets.

Messrs. Bell.—Mr. Wm. Hutley, Powers Hall, Witham, 1,100 Leicester and Down hoggets, 1s. 3d.; 300 Downs, 1s. 3d.; 300 ewes, 1s. Mr. John Hutley, Rivenhall, upwards of 1000 fleeces, half teg and half ewe, at 1s. for ewes, 14d. for Down tegs, and 15d. for half-bred tegs. Mr. Crooks's lot at 13½d., being 0½d. less than was offered at the dinner.

The following were the only parties whose wool was not sold:—Mr. White, Dunmow, 161 ewes, 129 hoggets; Mr. Porter, Shenfield Hall, 200 ewes; Mr. Burder, Weathersfield, 180 ewes, 93 hoggets.

EPPING WOOL FAIR.

Shortly after two o'clock a party of about forty gentlemen sat down to an excellent dinner at the Thatched House, which was in every respect satisfactorily furnished, and passed off most agreeably. Mr. William Kirkby, who had greatly interested himself to maintain the character of the fair, presided; and there were also present—Messrs. J. Scruby, J. Stallibrass, sen. and jun., James Stallibrass, Daniel, George, and James Gingell, T. Collin, W. and J. Northover, Rose, J. Pallett, G. Hooper, Lewis, Groves, S. Kirkby, B. Ricketts, J. Chilton, Rayment, George Rogers, James Fitch, Jonathan Savill, Thomas and William Hart, Stacy, John Brown, jun., T. Kybourne, Charles Smith, R. Barnard, &c.

The buyers present were—Mr. C. Bell; Mr. Halls, the representative of Messrs. Johns, of Chelmsford; Mr. Waite, on behalf of Mr. Oram; and during a portion of the evening Mr. Chapman. The business transacted was inconsiderable.

The Chairman, after giving the usual loyal toasts, said he should proceed to the business of the day, and as a beginning would offer to Mr. Bell the wool of Mr. Joseph Church, of Netteswell, 70 Down ewes and 200 tegs, at 15d. and 12d.

Mr. Bell purchased at 14½d. and 12d.

The following parcels were then offered in succession from the chair:—

Sold to Mr. Waite.

Mr. Rose, of Epping, 41 Down ewes, at 12d. Mr. G. Gingell, of Epping, 3 yearling rams, and 102 half-bred ewes, at 12d. Mr. Hooper, Lambourn, 153 Down ewes, 89 Welsh do., 38 Hereford do., and 15 do. tegs, at 12d. all round. Mr. Chilton, Loughton, 70 half-bred ewes, at 12d. Mr. George Gingell, Bobbingworth, 45 Hereford ewes, 73 Down ewes, and 53 Down hoggets, at 14d. and 12d. Mr. John Dennis, of Harlow Common, 92 Down and half-bred tegs, and 10 Down ewes, at 14½d. and 12½d. Rev. H. Cockerell, North Weald, 35 Down ewes, at 12d. Messrs. Wm. and James Northover, Epping, 420 Down ewes and wethers, and 110 Down tegs, at 14d. and 12d. J. W. Perry, Esq., Moor Hall, 177 Down tegs, and 110 Down ewes and wethers, at 14d. and 12d. Mr. Hart, North Weald, 160 Down ewes, at 12d.; together with the flock of Mr. W. Hart, North Weald, consisting of 57 Down ewes, at the same price. Mr. John Gould, Loughton, 77 Down ewes, 25 Hereford do., and 44 Down tegs, at 14d. and 12d. Mr. John Brown, of Latton, sold 160 half-bred tegs, 120 Down do., and 60 Shropshire ewes, at 15d. for half-breds, 14d. for the Downs, and 12d. for the ewes.

Sold to Mr. Bell.

Mr. Charles Smith, Parris Hall, North Weald, 66 Down tegs, and 66 Welsh ewes, at 14d. and 8d. Mr. William Kirkby, North Weald, 200 Down tegs, and 200 ewes; and Mr. S. Kirkby, Hatfield Heath, 76 Down tegs, at 14d. and 12d. Mr. Thos. P. Hart, Matching, 150 Down tegs, at 14d. Mr. H. Jennings, North Weald, 73 Down tegs, at 14d. Mr. Richard Barnard, Harlow, 191 Down ewes, and 34 long-wools, at 12d. Mr. B. Brown, of Harlow Common, 90 Down tegs, and 30 Down ewes, at 14½d. and 12½d. Mr. Daniel Brown, North Weald, 70 Down tegs, and 10 ewes, at 14½d. and 12½d. Mr. Benjamin Rickett, Great Parndon, 65 half-bred ewes, and 52 tegs, at 15d. and 12d. Mr. John Rickett, Netteswell, 75 half-bred tegs, at 15d. Mr. Kybourne, Rye Hill, 100 Down tegs, and 26 half-bred tegs, at 15d. and 14d. Mr. James Scruby, of Epping, 58 Shropshire ewes, 118 Down ewes, and 2 rams, at 12d. Mr. Lewis, of Lambourn, 103 half-bred tegs, and 14 Down and long tegs, at 14½d. Mr. John Stallibrass, 1,595 fleeces, tegs, and wethers, at 14d. and 12d. Mr. Collier, Netteswell, Bury, 100 half-bred tegs, 100 Down tegs, and 200 Down ewes, at 15d., 14d. and 12d. Mr. William Barnard, High Laver, 200 half-bred tegs, and 70 Down wethers, at 12d. and 15d. Mr. John Stallibrass, Haslingwood Common, 150 Down wethers, and 50 long-wool tegs, at 14d. and 12½d.

The flock of C. Cure, Esq., was subsequently sold to Mr. Bell, at 15d. for the Norfolk Downs; 14½d. for the half-bred Gloucesters; and 12d. for the ewes.

COLCHESTER WOOL FAIR.

On Wednesday, July 3, this fair (the first that has been held since the ancient borough was a manufacturing town) took place. A considerable quantity of wool has been disposed of by the growers previous to the holding of the fair; yet notwithstanding this, upwards of 10,000 fleeces were on offer in the course of the day, and of these nearly 6,000 were disposed of, the average prices being 15d. for hogget, and 12½d. for ewe and wether.

The quantity brought to the scale was 5,589 fleeces, weighing 250 cwts. 2 qrs. 11lbs.

At three o'clock about 70 gentlemen sat down to dinner. J. Gurdon Rebow, Esq., took the chair, supported by J. Bawtree, H. Walton (the Mayor), W. F. Hobbs, C. Nunn, H. Skingsley, J. B. Royce, and J. Tabor, Esqrs.; Mr. G. Lithgow acted as vice-president.

After the usual toasts, the Chairman said that the growers in the upper part of the county having felt the benefit of the wool fair at Chelmsford, and the advantages of the railway easily enabling the buyers to extend their journey a few miles further, induced the East Essex Agricultural Society to make the attempt to establish a wool fair here ; and they would agree that it had been crowned with success. When he stated that between 7,000 and 8,000 fleeces had been exhibited, of which 2,000 were by sample—in fact, that 7,300 were exhibited for sale, they would agree with him that the result had justified the attempt. He would now proceed to business. He did not know whether they would expect him to flounce at once into cold water, but he would offer his wool, consisting of 800 fleeces, 577 hoggets, and 231 ewes, to Mr. Unwin, at 16d. and 13½d. : Mr. Unwin declined. After a brief discussion,

Mr. W. Fisher Hobbs said, as one of the committee who recommended this fair to be established, he would take the liberty of making a few observations. He recollected at the time this fair was determined on, he mentioned that the buyers would oppose the 4lbs. not being allowed; but he thought they ought not to go back to old customs, but adopt those that were just. He never sold a pack in his life otherwise than on the principle this fair adopted, that of giving good weight, and no more ; and he thought there was not one farmer in twenty there who had sold otherwise. At Chelmsford they were getting into that way ; for Mr. Hutley, whose wool was one-fourth of the whole offered, sold without allowing it. Therefore he thought they would not do right to go back and adopt old customs, to which they as farmers were not accustomed.

The Chairman gave, " To our next merry meeting," stating, that the growers of 9,120 fleeces had signed a paper to show at the fair next year (*cheers*).

The following were the prices obtained from the principal buyers, viz.,

Mr. Unwin.—Mr. Hart, 197 Down hoggets at 15d. ; Wm. Ward, 15d. and 12½d. ; Mr. Partridge, 15d. and 12½d. ; Mr. Lithgow, 15d. and 12½d.

Mr. Gardner.—Mr. S. Cooper, 15d. and 12½d. ; Mr. C. G. Round, 15d. and 12½d. ; Mr. Folkard, 346 fleeces at 12½d. ; Messrs. H. and W. Woodward, 133 hogget and 59 ewes at 15d. and 12½d. ; Mr. T. Cooper, 383 hoggets at 15d., and 84 wethers at 12½d.

CROYDON WOOL FAIR.

This fair was held on Saturday, July 4, when, there being a good show of samples at the Townhall, and a large attendance of the neighbouring farmers, a considerable amount of business was done. The prices will be best gathered from our report of the proceedings at the dinner, which took place shortly after three o'clock, at the King's Arms Inn, where a well-served repast, entitled to special commendation for its excellence and variety, together with capital wines, gave general satisfaction to the party that assembled.

Charles Bleadon, Esq., presided; Mr. Henry Rowland occupying the vice-chair. Amongst those present were Messrs. Robinson, Randall, Bottomley, Coxe, Duke, Simpson, Smith, Blake, Weall, Cressingham, Brown, Washborn, sen., Washborn, jun., Walters, Gutteridge, King, Taylor, Chasemore, Gibbs, Stile, Furnell, Stringer, Legg, Goulds, Burford, Stenning, Weare, Richards (Hon. Secretary to the East Surrey Agricultural Association), &c.

On the removal of the cloth, after the usual toasts,

Mr. Gutteridge said—I beg to offer my wool to Mr. Furnell at 33s. per tod.

Mr. Furnell.—I take it (*applause*).

The Chairman announced that Mr. Hill had sold 225 tegs at 12¼d., and 500 ewes at 1s., to Mr. Legg.

After one or two ineffectual attempts at a sale,

The Chairman rose, and proposed the health of " the woolbuyers," with which he coupled the name of Mr. Legg.

Mr. Legg, in rising to return thanks to the Chairman, must state that the market was not in a very favourable state. If they looked to the markets of Yorkshire, they would see they were falling gradually, in some instances as much as 1s. and 6d. in a week. The buyers were prepared to give the full value, but if they could not get the wools at such a price as they could afford they must leave them. They would give them full prices, but when they stood for the uttermost farthing it was that which prevented business.

Mr. Gibbs said Mr. Rowland's was an exceedingly good lot of wool. There was only a farthing difference between them, but really he should not be able to make that farthing a lb. profit of it. He repeated his offer.

The Vice-Chairman.—For the sake of the business of the fair I accept the offer.

Mr. Legg said wool sold at Colchester at the price named, but he begged them to remember it was a cross between the Down and Leicester, wool that generally sold for more than Down tegs. It was known to feed on a better soil, and its wool was intrinsically more valuable. At Chelmsford the majority of the wool sold at 14d., but then there was no such wool here to-day, for though sheep might be bred from a favourite stock, yet in the transmutation they often deteriorated a little.

Mr. Stening offered his wool at 12¼d. and 14d.

Mr. Gibbs accepted the offer (*applause*).

Mr. King stated that he had sold his wool, 600 ewe and 200 tegs at 13d., to Mr. Crittal.

The Chairman proposed the health of " Mr. Weall," a gentleman who had come amongst them when a young man, and whose talents and integrity had rendered him respected and esteemed by them all (*loud applause*).

Mr. Weall rose amidst loud applause to respond to the toast. He commented on the disgraceful mode in which the agriculturists had been deceived by their leaders, amidst the cheers of the meeting: he preferred an open foe to treacherous friends.

Several other toasts were given of a local and general nature.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

NEWCASTLE MEETING.

The proceedings of the Meeting commenced on Tuesday, July 14, with the trial of implements. The Implement Yard was also opened to the public, and a Lecture from Professor Johnston "On Manures and the best method of applying them," was delivered in the afternoon, and which is subjoined. On Wednesday, the implement yard was continued open, and a Lecture, by Mr. Parkes, "On Draining," was delivered in the Lecture-room, in Nelson-street, and was numerously attended. A full report of the Lecture will be found annexed. On Thursday the whole of the Yard, including Cattle and Implements, was thrown open; and the Dinner took place in the Pavilion, at which about 1,200 attended. In the course of the day upwards of 30,000 persons visited the yard. We subjoin a full report of the proceedings at the dinner.

PROFESSOR JOHNSTON'S LECTURE.

On Tuesday evening, a meeting of members of the society and their friends was held in the Nelson-street lecture-room, to hear a lecture from Professor Johnston on the chemical principles involved in the preparation of manures, and their action upon crops. The attendance was pretty numerous, amounting to about 500 persons.

The noble **CHAIRMAN** said—It is my duty to introduce to your notice Professor Johnston, whose object to-night is to lead you—not to lecture—but to lead you to this discussion, and thus to state to you those observations and facts which he is so well enabled to bring before us, for the purpose of inducing each and all of you to take part in the discussion. The subject, then, is not a lecture, but a discussion (applause). Now, gentlemen, the way in which I propose that the discussion shall be carried on is this; as soon as Professor Johnston has made the statement which he has to lay before us, I propose to ask any gentleman to address such observations as he may think applicable with respect to whatever may have arisen (applause). I shall hold in my hand a paper containing the various points to which I should wish to call your attention, the object being to obtain all the information we can from those residing in this locality, and at the same time give in return all the information possessed upon the subject by those who come from the south of England (applause).

Professor **JOHNSTON**, upon presenting himself, was loudly cheered. He said—My Lord and Gentlemen, the subject which has been selected by your council for the purpose of being made the subject of discussion this evening, is one of so very important and mighty a nature that I could not hope to explain to you the principles upon which it depends in a single hour, which is the very utmost time that I suppose ought to be placed at my disposal. But besides, gentlemen, the observations that I am about to offer o you are intended to lead to an after discussion, and therefore, inasmuch as the essential principles do not, perhaps, well admit of discussion in a meeting like the present, I shall select such points to bring before your notice as are of a practical nature—points which I hope will suggest to your mind topics upon which I trust you will be able to lay before the meeting observations far more valuable than I can offer you (applause). Gentlemen, the relation of British agriculture to the present condition of this country involves two great points. In the first place, the production of a larger amount of corn, for the purpose of rendering us independent of foreign supplies, so as to enable us to meet the wants of our large and unceasing population; and, in the next place, it demands the production of this increase at a cheaper rate, so as to enable us better to contend with foreign competition (applause). The first of these ends—the production of a greater amount of corn—may be obtained in one of two ways—either by bringing more arable land into cultivation, or else by causing the land which is now under culture to produce a greater amount of corn (applause). In regard to the first of these means there are, as you are doubtlessly aware, great difficulties in our way, which 20 or 30 years ago did not exist. As you know, there was a large quantity of land twenty or thirty years ago, which lay waste, but which has since been brought into cultivation, and consequently it cannot be expected that an equal amount of land can be reclaimed during an equal number of years to come (applause). On the other hand, the present amount of corn may be increased by rendering the land more productive, that is, by causing land which now only yields four quarters an acre produce five (applause). Again, corn may be rendered cheaper in two ways. It may be done by lowering rents or reducing the rate of the agricultural wages; or, secondly, by increasing the produce of your land without increasing the expense of production, by causing lands which yield four quarters per acre to produce five without any increase of expense (applause). Now an interesting question arises in the outset, which I am sure you will like to have your attention directed to. If by making the land more productive we are to raise more corn at a cheaper rate, how much of the land of the kingdom is capable of being so rendered more productive? If you were to ask my own individual opinion upon this point, I should at once state it as being my belief that nearly nine-tenths of the land under cultivation in Britain might be made to produce more corn than at present by the application of improved treatment (applause). I speak this, gentlemen, as my own individual opinion; but as this is a point of great importance, I have merely thrown out this opinion for your consideration, and I trust that it will call up some gentleman who is better acquainted with the productive qualities of the land in the kingdom than I am (applause). But suppose, gentlemen, the land is capable of being rendered more productive, you will ask to what extent? Now, in regard to this question, I believe it is impossible to give a very decided or absolute answer. But I can examine the land in one part of the kingdom, and ascertain how much corn it is capable of producing; I can examine the nature of that soil, and ascertain its formation. Unfortunately I have not a map with me as I supposed I had. We will, however, suppose that there is a soil of a particular formation and a given geological quality at this end of the room, and that at the other end of the room there is a land of a similar quality; if, then, I find that the land I have pointed to in the first instance will grow 30 or 40 bushels an acre, then I say I am justified in inferring that the other land, having a similar or equal soil, will produce an equal quantity (applause). And if I see some land of equal geological quality as the first-named land, then I am entitled to say that it only requires the exercise of proper skill to bring it within an equal state of productiveness (applause). A short time ago I happened to visit the estate of an old friend of mine, Mr. Aitcheson, of Dromore, whom some of you doubtlessly know, and after walking over his farm, he showed me his books, in which he had kept an account of the extent of his land, the produce, and what it sold for, from the commencement of the present century. In 1820, I found that the produce of 100 acres of that land averaged 50 bushels of oats per acre. In 1832, I found that 120 acres of land sown with wheat produced 40 bushels per acre, whereas this 120 acres afterwards, the season being better for oats, produced 80 bushels of oats. Now, when I came to examine the nature of the soil, I found that this difference was caused by the application of an improved system of management and a proper system of manuring (applause). This soil was not of a good quality, being upon a coal sub-soil, and exposed to the east winds from the Frith of Forth, and yet in that district we find that a farmer has been able to raise the amount of his produce to 85 bushels of oats per acre on an extent of land amounting to 100 acres. (applause). I take this as my stand. You may say that this is the limit to which a man may go. For my part, however, I do not think it is, but that I am entitled to say to you that by the application of similar means to similar land the same results will follow (applause). And then, again, gentlemen, if from these districts—if from these coal measures—and I allude to the coal measures because you have them in abundance in this neighbourhood—if, I say, in this country, you find this to be the case, I would carry you still farther north, and I will assume that some of you know the county of East Ross-shire, and some, I doubt not, have skirted the eastern coasts of Sutherlandshire, and beheld the large crops of wheat and turnips to be found there. Now if I had had a geological map, as I intended to have had here, I could have shown you various districts, in different parts of the island, where the geological character of the soils are identical with those of Ross-shire and Sutherlandshire. And if you find, in South Wales, land of a similar character to this which eats up all the dung and drinks up all the water given to it, but on which equal crops might be grown to those grown further north, but which in Wales produce much less, then, I say, I am entitled to believe that, if equal skill was applied, equal results would follow (applause). But I think, as a scientific man, I am bound to put to myself a further question—I am bound to ask myself whether we may not justly and fairly compare unlike soils with like soils—compare good and naturally fertile soils with soils naturally unfertile; and you are entitled to ask of science whether it is not in the legitimate scope of the agriculturist to bring about such a state of things at least that the naturally unfertile soils shall grow as much as the naturally fertile soils (Hear). Now, without saying it is impossible to do so with this or that peculiar soil, there is one thing which I can justly and fairly assume from the progress of scientific skill, that there has been, and can be, great improvements in poor lands (applause). I am as unwilling as any man to be sanguine in my opinions, and I am still more unwilling to be sanguine in my expressions; but I do think that practical men are justified in asking from science whether such an improvement is one which can be ultimately accomplished? (Hear). And I do say that I cannot see my way to the result that the scientific man is justified in saying that this is an object which the practical man may not justly expect from the scientific man: at the same time I must allow that for such a result we must allow time for the further development of science and knowledge (cheers). I allude to the progress of sound knowledge and practical experience, because I have lately found published, in various periodicals, a relation of several experiments—and experiments are valuable by whomsoever made, but more especially so when made by skilful men. Among those were some made by Mr. Vernon Harcourt, in which he had applied, for the growth of turnips, bones and guano to certain soils. By the application of bones he procured 30 tons per acre: by the use of guano he got 30 tons, and by the use of both together he still procured no more than the same quantity; and from this he inferred, that he had reached the utmost limits to which human skill could go (Hear, hear). Now these experiments are excellent. They are so for materially contributing to the progress of knowledge; but the conclusion I believe to be hasty; for I am quite sure that the practice of other men would have produced still greater crops (cheers). Suppose, with myself, that the land can be made to yield larger crops, the question next arises how is this increased production to be brought about? There are two ways in which this increased production can be promoted: the one is by economy; and though I may not always use this word economy, I hold that no farmer is bound to undertake improvements which do not pay their own cost, and leave him a profit besides, and the principle pervades my observations whether I make use of the word or not (Hear, and cheers). It is nothing in my eyes that, by the application of chemical mixtures, you can grow three or four bushels more corn than your neighbours, unless the value of that increase very considerably exceeds the value of what you apply to the land; and, therefore, if I leave the word out, I beg you to remember that is my opinion of improvement. There are two means of improving the land, then—draining, sub-soiling, the use of any of those beautiful instruments which you have seen to day, or the application of manures. Draining, and the first things mentioned, will come more particularly under your consideration to morrow. But the second set of means are chemical means, and this includes, among other things, the application of manures (Hear). Many of you perhaps might say—and justly—that your land required no draining, but you would perhaps also say that the land could be rendered more productive. If I ask you, as I did Mr. Aitcheson, of Dromore, how that was to be done, you also perhaps would inform me that it was because your land had been highly manured (Hear, and cheers). This was the secret of his success. If it were necessary for me to bring before you an illustration of the observation I have mentioned, in the great benefit of this high farming on a large scale, I might draw attention to the neighbourhood of many of our large towns—not, I am sorry to say, in the neighbourhood of Newcastle—and the fertility of these neighbourhoods. I take you particularly to Edinburgh; but I might also take you into Lincolnshire, and ask you how it is that in Lincolnshire the heaths and the wolds have been rendered fruitful? I would answer, that high manuring was the source of all this success (loud cheers). Now the question which you will naturally ask of me, and which I am called on to answer is, how that high manuring acts to produce so beneficial a result? This is answered just by telling what those plants require from the soil, and secondly of what manures consist. The first is easily answered. If you burn a piece of wood, it burns away, but all is not consumed. A small quantity remains behind, and that is the case with all the vegetables you produce—the residium being in some cases more, in others less. In the burning of all vegetable and animal substances you have this portion left behind, and this is called ash, or the inorganic portion of plants, whilst the part which disappeared was the organic part. The inorganic parts differed in quantity in various plants. (Mr. J. here referred to the tables placed on the wall to illustrate the difference in [the quality of ashes, and continued). Now let me draw your attention for a moment to the organic parts which constitute the largest portion of plants. I can best illustrate this to you by taking a quantity of flour, which I will make into dough. If I wash this dough, and pour the water with which I have washed it into a tumbler, through a piece of muslin, the water will pass through into the glass in a milky colour; in a short time a pure white substance will settle to the bottom—that is starch. But upon the muslin there will be a subtance which will not wash through, and which is totally different from the starch, and also different from the dough itself—this substance is what is called "gluten." You must apply what you see here to every other plant and part of plants. It is true that every plant has their kinds of matter: one somewhat like starch, and the other nearly similar to gluten. Now this starch—the one portion of organic matter—consists of three elementary substances. In this part of the country (in the north of England) it is hardly necessary for me, for the instructing of the inhabitants of the town, to make them acquainted with these three elementary substances; but I do it at the request of the council, and I shall, therefore, for a moment or two draw your attention to them. Gluten, then, consists of carbon, hydrogen, and oxygen. Of these three substances, the first of them, carbon, is most familiar to you under the name of charcoal. This black charcoal which you see here is carbon, with a very trifling foreign mixture. The next two substances consist of different kinds of air. Now, it is impossible for us, by the senses, to perceive the difference of these two kinds of air—oxygen and hydrogen. But it is very fortunate that we are not bound by our senses, that we possess intellect, which can discover what the senses cannot, and by the application of which the Deity has enabled us to make discoveries which twenty senses would never do. Now, I take this simple instrument, this lighted taper, and place it in the bottle containing hydrogen, the taper is extinguished, and the hydrogen takes fire and burns. If I put the taper into this other vessel containing oxygen, we perceive at once the difference between these two elementary substances, which our senses would not enable us to do. The taper does not refuse to burn; on the contrary, it burns with far more brilliancy than in common air. Now, of these three substances—of these two gases, hydrogen and oxygen, and of carbon—this charcoal, this starch, consists in all the vegetables you reap; in all the vegetable food which is for the support of our bodies, there exists a large proportion of those substances which consist of those three elements only. But I have told you there exists in all vegetables a substance called gluten. Now this gluten—besides the three things to which I have called your attention—contains a fourth called "nitrogen," and a very small quantity of sulphur and phosphorus. Now the senses of sight and smell will not tell you that this is anything but common air. The same little instrument which we used before, however, enables me to tell you that here is something besides common air, and oxygen, and hydrogen. When I put in the taper, it is extinguished as it was in hydrogen; but you will recollect the hydrogen took fire: this does not. Here, then, there is a clear distinction between hydrogen and oxygen, and nitrogen. Now these four—carbon, hydrogen, oxygen, and nitrogen—with a little sulphur and phosphorus, exist in all plants; and also in all plants, I must beg of you to remember as a point which, before I close, will be of great importance, there is a substance called "gluten," or some substance which resembles it in containing nitrogen. I now come to the inorganic matter or ash. What does this ash consist of? Potash, soda, lime, magnesia, oxide of iron, manganese, phosphoric acid, sulphuric acid, chlorine, and silica. Now it would require a whole lecture to explain the properties of these ingredients of the ash, and I shall not, therefore, attempt to do so: with most of them you are familiarly acquainted, as the common pearl ash, the soda, and lime; oxide of iron is the rust of iron, and oxide of manganese is very like the oxide of iron; phosphoric acid is the substance called phosphorus, which I hold in my hand, and which commonly ignites when placed against a piece of warm iron; the sulphuric acid is the common oil of vitriol; chlorine and silica are the two remaining ingredients of the ash which I mentioned. Now these exist in all plants; and having explained that to you, let me tell you further, that every plant you grow obtains a certain portion of its substance from the soil and a part from the air. Now the substance which is got from the air all plants may get, although I do not say that they always do; but the substances out of which is formed gluten are got from the soil. I have now explained what a plant consists of, and where it gets the substances of which it does consist; and allow me to tell you that the plant lives on its food as we do (laughter and applause). It draws its food from the air and the soil, and that which it draws from the soil must contain those things which form gluten. If, gentlemen, the soil contains the whole of these things, then it is naturally productive; if it does not contain them, it is not a naturally productive soil. We must then add those things of which the soil is deficient, and those things which it does not contain at all (applause).

This is the way in which I wish you to act. In feeding your stock you give them plenty of that food which you know is good for them, and if you give them plenty of good food you know that they will grow fat and large, if not they are starved and stunted (Hear, hear). Now you must just do the same to your crops (laughter and applause). You must put plenty of suitable food in the soil; previous care being taken to know what is required (loud applause). Now, gentlemen, I come to the other division—to another question which here arises. If these be the ways in which manures act, and if their action is of so great consequence to the crops, you will naturally ask in what way the manuring can be more generally secured throughout the country (Hear hear)? In what way can it be more generally adopted, introduced, and practised? In the first place, many of you are aware, as was remarked by a gentleman who came in the railway with me yesterday, that a great and unnecessary waste takes place in the farm-yard, and in the management of the farm generally (Hear, hear). We find a ready method by which a high manuring can be secured, is the adoption of means for husbanding what is now allowed to run to waste. I know there are persons here who understand this part of the subject much better than I do, and will be better able than I am to direct your attention to it; but if you refer to the table exhibited you will see the composition of the liquid part which runs away in the first place from the byers in which the cattle are kept, and secondly from the manure heap itself. You will see that whilst the liquid manure contains phosphoric acid, and the liquid that runs away from the dung heap contains phosphoric acid; therefore, there is not only a loss of the liquid, but also of the phosphorus in that liquid, which is allowed to run from the dung heap and go to waste. This is a point, however, to which I hope some other person will draw your attention. Then there is another method by which high manuring may be secured, and that is by saving the waste of our large towns. You all know what the waste of large towns consists of, and that the waste of large towns such as Newcastle and London can be collected and applied to the land, and you know that a much larger amount of corn would be produced from the land to which that manure is so applied. That is a point to which I will but briefly allude. It is one surrounded by great difficulties. There is, first, the difficulty of collecting this; and then there is another difficulty to which scientific men have not turned their attention, namely, how is it to be disposed of? You must not only collect the substance, but you must find a market for it. You know very well that the manure of London is purchased at the mouth of the Tyne for a shilling a ton; and the waste of Newcastle may be bought for a shilling a ton. So that there must be a very small demand when so small a price is given for it. In towns like Newcastle and Durham, the revenue from this source by no means pays the expense of collecting it from the street; but there is no reason why the demand should not be greatly extended, and the revenue from that source be applied to defray the expenses of police. In a large town like this, where extensive manufactories exist, there must be many substances which, if collected and applied to the land, would make it more productive; such as the refuse of gas works, soda manufactories, and soap works: and these could be supplied to the farmers for little or nothing. Another means by which a higher manuring can be secured, is, by the extended use of imported manures. The importation of bones has almost revolutionized agriculture, and the introduction of guano has produced a still further revolution. There are two ways in which these manures act in producing these results. The latter kind is extremely portable; and by carrying it to high places where the ordinary manure could not be conveyed, large crops have been produced where before all was sterile and unproductive. The portability of guano has caused it to be much more generally applied than bones. If we take the town of Berwick, for instance, before guano was introduced, the amount of bones sold in Berwick was three or four thousand tons in the year, amounting to about 20,000*l.*; last year not more than six or eight hundred tons were sold, amounting to not more than about 4,000*l.*: but instead of the 16,000*l.* worth of bones formerly sold, there have been 5,000 tons of guano imported and sold, which, at 6*l.* a ton, amounts to 30,000*l.*; and, therefore, we have 30,000*l.* of guano taking the place of 16,000*l.* worth of bones. Farmers do not apply manure for the mere sake of applying it, but for the purpose of rendering their land more productive and getting more corn from it; and such has been the result of the application of guano, which, besides being more portable than bones, can be applied where bones cannot; for example, as a top dressing for land. Another means by which a higher manuring can be secured, is, by the preparation and extended use of manufactured manures. I have already explained the composition of plants and the general principles on which we apply manures to land to increase its fertility. Suppose you have a soil composed of sea sand, from which the plant can derive none of the substances which go to form its constituent elements. In order to render it productive you must add those substances which the plant requires. And if the soil contain some things which the plant requires and be deficient in others, then you must supply those substances of which the soil is deficient, and which the plant requires, in order to render the soil productive. You must adapt the manure also to the peculiar description of the crop you require to grow—wheat, barley, oats; or according as the land is deficient, the substance which they require must supply the deficiency, in order to render it capable of yielding a good crop. Of course the practical farmer will take care not to add to soils the things they already naturally possess. Gentlemen, before concluding, I must say that there is one point of very great importance to which all must ultimately come; it is one which, when we have arrived at it, will have created an entirely new era in the practice of agriculture. I believe the time will very soon come when you will no longer purchase manures ready compounded to your hand—when you will no longer buy this man's guano and that man's guano—this man's manufactured substance and that man's manufactured manure—under whatever name it may pass. The time will come, I say, when every man will know what his plants require, what his soils contain, and consequently what substances his manure ought to contain; and having this knowledge, no man will buy manure, the analysis of the composition of which has not been published. Not only will he not buy substances with the composition of which he is not acquainted, but the qualities of which he cannot understand. He will be able to prepare his own recipes, and send them to the manufacturer to be prepared (Applause). In the north of the island—where I am better acquainted with agriculturists than I am in more southern parts—I have ventured to predict that this state of things will come round in about five years hence. In five years hence, I say, I believe, the farmers of Scotland will make up their own recipes, and send them to the drysalter to prepare for use. I don't know how soon this may be the case in this part of the island, but I do know that this is the legitimate end to which we as scientific men, and you as practical men, are bound to look. I think it is one which you ought to regard as deserving of your striving to attain to it. But, gentlemen, I am quite sure that you will agree with me in this. If we are to arrive at this point, knowledge must be diffused more widely amongst the agricultural body than it has ever hitherto been (Hear, hear). You will see the importance of diffusing elementary scientific knowledge more generally among the agricultural body —of enabling them to know what potash and soda, lime and magnesia, and all similar substances are. He cannot know the value of them on his farm unless he knows what the things are themselves. Therefore you will see how important it is that this knowledge should be generally diffused throughout the community. It is important to the country at large because the consumption of the country is continually increasing. And further, you will see how important it is to attain this knowledge when every class is vying with every other class in the attainment of knowledge, and when it is particularly desirable that the agricultural community should not lag behind their fellow countrymen. The manufacturers of corn ought not to allow their intellect to be less developed than the intellect of the manufacturers of cotton (Applause). Not only is it desirable that he should be elevated in the standard among his fellow-citizens, but how important it is that you should enable your sons to obtain this knowledge ! Because it is quite certain that the next generation of farmers must know more than the present and past generations have done (Applause). If, gentlemen, your sons—who shall live when you and I are gone—do not attain this knowledge; if they are not better instructed than their grandfathers were, your sons will vanish from the land. They will not occupy their fathers' places, but will give way to other men. It is a consideration of very great consequence, and one that ought to have much weight with you, that in all our large towns—in Liverpool, Manchester, Birmingham, Edinburgh, Glasgow, and Dundee—in every large town, in fact, the heads of manufacturing establishments are bringing up one or more of their sons to farming (Hear, hear). And how are these manufacturers to bring up their sons to be farmers ? Not merely by sending them to work and drudge with this or that practical farmer, but by sending them to the fountains of knowledge, and giving them the best kinds of information, thus arming them to the utmost of their power, and enabling them to overcome and vanquish the stubbornness of the soil, and other disadvantages which they may have to encounter (Applause). Manufacturers' sons, then, are learning to take the place of farmers' sons. Hitherto the tide has set the other way. From the country to the towns has been the order of things until now; but by and bye the tide will begin to turn, and the sons of the manufacturers will begin to turn your sons from the cultivation of the land. There are many curious facts which, I can tell you, do not speak very well for the agricultural body. It is said very often that the agricultural body does not want knowledge. For example, I have been told that, in the college at Cirencester, among forty men entered, there were only six or eight who were the sons of farmers (A voice—"That is not true"). Nobody is more anxious than I am for truth, and I am happy to be informed that this statement is untrue. I have seen too much of farmers to believe that they are averse to the acquisition of knowledge, and have mixed with a majority, I may say, of the farmers on the other side of the Tweed, and I know that no men are more anxious for knowledge than they are. No men are more anxious that their sons should be made intelligent than they are. But such things as I have stated to you (though the particular statement, I hope, is not true) do seem to imply that the agricultural body are not so alive to the acquisition of knowledge as they ought to be. I believe that if you only put this knowledge within the reach of farmers —show them what they ought to learn, and how they may learn it—the agricultural body of England, like every other body of the community, will make such intellectual advances as will enable them to compete with all the world, as the manufacturers have already done (Applause).

Sir HUNGERFORD HOSKYNS begged to ask the learned professor whether guano ought to be covered by a top-dressing, or might be left upon the surface, as there was a generally received opinion that a great deal depended upon its proper application to the soil.

Professor JOHNSTON replied, that if the guano were merely sprinkled over the soil, and no rain followed, it would be ineffective ; but if rain fell, then its use would be best seen.

The Rev. T. R. SMYTHIES, Herefordshire, who described himself as an extensive practical farmer, rose to express his opinion as to the utility of guano. He believed he purchased guano from the first cargo that was ever imported from Peru ; and this he tried upon a parcel of land which had been notoriously barren, and the result was most satisfactory. He had seen guano tried with success as a top dressing for wheat. Upon gravelly land principally, if rain did not fall immediately after the guano was put on, the wheat would be burnt away, but if rain fell, the wheat would grow well. His own mode of proceeding was to sow it, and hoe it in upon drilled wheat, and then it did not do any harm.

Lord PORTMAN requested Mr. H. Thompson to make some observations on farm-yard manure.

Mr. THOMPSON then came forward, and stated that he formed a large excavation for a tank, to which he attached a pump, which gave him a perfect command over the manure at all times. It was inconvenient to have all the manure in one place, and the same method of management could not be carried out under all circumstances. He wished to call the attention of farmers to certain easy principles, which, if carried out, would lead to the prevention of much waste. The two things which farmers ought to pay attention to were, a due regulation in the supply of air to manure, and also a proper supply of water. With respect to air, its effect was like the action of a slow fire, and the degree of the decomposition of manure depended upon that supply. If they took two heaps of wood, and burnt one where air was excluded, and the other were there was a good supply, in the former case there would be a waggon load of charcoal, and the other a very small quantity. Now, in the farm-yard combustion did not go rapidly on, and therefore if it were exposed in the open field the carbonic acid was carried off, and great waste was produced. Again, he wished them to observe that, by exposing manure in the open field, rain would wash away the soluble parts, and thus deprive it of that which is most valuable. (Applause).

Mr. JOSHUA CROMPTON was called upon to speak with reference to liquid manure tanks. When he commenced farming, about fourteen or fifteen years ago, he was very much struck with the unsightly objects which were to be seen in the neighbourhood of the farm-yard, on account of the great quantity of liquid manure which was continually flowing away, and only served to fill up the ditches and promote rank vegetation. He first constructed a small tank upon his own premises; but finding it too small, he constructed a larger one, capable of containing about 40 cubic yards. This, however, he found was quite inefficient, although the buildings around were quite well spouted, and he constructed a tank capable of containing 100 cubic yards. He wished particularly to impress upon those who had not tried the plan of erecting tanks, that the larger the tank the greater would be the benefit derived from it, for it was only at certain portions of the year that liquid manure could be applied. He would have to each farm-yard a tank sufficient to contain liquid manure which would flow from it for one year; because he felt perfectly convinced that the longer the manure was in the tank the more efficient it was in communicating its properties to the soil, which were advantageous to the crop. It was of great importance that the tank should be perfectly water tight. The quantity of manure which he put was about 25 cubic yards an acre. He found that the best time for applying this liquid manure was about spring, soon after the grass had begun to shoot. If he had a constant supply of liquid manure, he would also apply it after the grass had been cut; not immediately after the hay had been carted, but he would wait until there was a little rain, or the ground was covered with fog. He had tried it for 14 years on one field, which had never had any other manure than the liquid. The first crop he always used for hay, the second crop for green fodder. On several occasions he had tried the liquid manure with the greatest advantage upon pasture land, light and heavy clay land, and upon seed. That portion of the field in which he used it for seed, he found that it greatly increased in luxuriance. In conclusion, he would impress upon them always to make a large tank, as it could be made available at any time.

Mr. Crompton rose and said: I have been asked by a gentleman as to the mode in which I spread this manure upon the land. Generally speaking, I found it was so thick after it had stood in the tanks some time, that it was impossible to run it through the holes of an irrigator. I then got a pump, and set a man to pump it into a large barrel and cart. In the barrel there is a large hole, and when the cart arrives upon that part of the meadow which I intend to be irrigated, the man pulls out the plug; and as the cart proceeds, the man spreads it over the land with a large stick. Thus the only expense attendant upon this process is that of the man in pumping and spreading the manure. I would recommend any man who intends to commence the use of a tank to procure a wooden pump. I have tried both a copper and an iron one, but neither of them lasted a year.

Mr. Dawson: Will you inform me whether you ever applied sulphuric acid to this manure?

Mr. Crompton: I never did; I never applied any chemical manure in it; but I have no doubt that any one doing so would find the result to be highly advantageous.

Mr. Smith, of Deanston, then presented himself and was loudly cheered. He said, I am afraid I rise at rather too late a period of the evening to enter very fully into this subject. At the same time, having heard the excellent lecture of Professor Johnston and the many able speeches which have been delivered, having reference to the qualities of liquid manure, which promises so much for agriculture, you will pardon me if I occupy a short portion of your time (applause). Professor Johnston, in the course of his remarks, adverted to that kind of liquid manure which is found in the sewers of towns. My attention has long been drawn to that subject, but I must confess that when I first viewed it, great difficulttes appeared to present themselves. It appeared that the land being at a great distance from those towns where this manure was to be obtained in abundance, a great expense would be incurred in consequence. Afterwards, it occurred to me that by pumping it, it might be conveyed to the country, and by having it pumped to a certain elevation, it might be spread upon the land by a jet (hear, hear). Last year I was fortunate enough to induce a friend of mine, a farmer in the neighbourhood of Glasgow, who has 300 acres of land under his management and 500 head of cattle, to fit up a pump to convey the liquid manure which ran from his byres on to his land. At one time I had seen a stream of liquid manure as thick as my arm running from the byre, and upon inquiring if he was in the habit of permitting this, he replied in the affirmative. I advised him to have it conveyed over his farm, and, after some hesitation, he consented. He procured a number of long tin pipes, which he lengthens or shortens as may be required, and by means of these the manure is carried over the land. The result of the experiment has proved very gratifying, and he has now obtained pipes by which he can irrigate the whole of his land. This season I saw forty-five young Irish bullocks wading nearly up to the fetlocks in grass, in the month of December, and the fields which had been irrigated with liquid manure were unquestionably finer than any of the others (applause). He has applied this manure to other crops. Upon one occasion, he had a field of turnips, which appeared very sickly and unhealthy, and he applied the manure to them by causing it to run down the drills for a certain time, and in a few days they showed symptoms of recovery, and in November last I can say that they appeared very fine indeed (applause). This winter and spring he applied the liquid manure to a crop of wheat, and although the soil is indifferent, the wheat is a very fine crop (applause). It has also been applied to crops of barley and oats, with similar beneficial results. Another advantage results from this manure. Whenever your dunghills become dry, by exposure to the sun, you can pump the liquid manure upon it before use, and thus moisten it; for, as you are aware, manure that has become dried with exposure is of very little value (applause). Encouraged by the experiments which I have made, and seen made by others, several gentlemen and I have made a number of calculations, and the results are highly satisfactory; we have obtained estimates, and we find from the calculations made, that we can afford to pump the liquid manure from the sewers of towns, convey it to a distance of eleven miles into the country, and spread it upon the land for 3d. a ton. We had no difficulty in inducing farmers to take advantage of this plan, and no less than the supply of 20,000 acres had been subscribed for (cheers). I may mention another way of using liquid manure, at a trifling expense, used by some of the small Irish farmers. They divert a small stream to pass near where they have a dung heap, and at a proper time they tap the dung-hole into the stream. The manure is thus very much diluted, but the more it is diluted the more ground it spreads over, and thus the greatest benefit is secured at the least possible expense. But the greatest experiment made in this way is that by the Duke of Portland at Mansfield. He had there a great tract of land running down a valley, which was formerly almost wholly a rabbit burrow, valued at 4s. 6d. an acre. The noble duke had laid out 30*l.* in making drains for conveying the sewer water to this place from Mansfield. His lordship had carried this over 400 acres, and although the quantity of sewerage water from Mansfield was only from 10,000 people, and the liquid, from the nature of the population, not very rich, yet, notwithstanding, those 400 acres now bring about 4,000 per annum, some bringing 5*l.* an acre, and some 14*l.* (Hear, and cheers.) I speak as a practical farmer, and I have paid great attention to the carrying out of liquid manure in carts, more particularly on to stiff loams, and I am convinced that it is the least economical manner that could be adopted. I will go further, and say that if the farmer drenches his solid manure with water, and pumps it out in a liquid form, he will find it to do his land more good than if carried out in a solid form; and if you will try the experiment, you will find it so. The cost of laying the necessary pipes for pumping this manure on the land would not exceed 2*l.* an acre, and the interest of this, with the cost of applying it thrice a year, would not cost more than 7s. per acre a year. Now, you well know that, by carrying out your dung in carts, it will cost far more than that sum (Hear, and cheers). I may be allowed to say a few words on the way of keeping your dunghills at home. There is one principle not yet properly introduced, and that is to bring the manure forward at every season so as to have it ripe at the proper time. It is too much the practice to tumble all in one solid mass; and I would say that if the farmer who wants to manage his dung in a proper manner would take care not to have ripe and unripe mixed, he would not have to complain so frequently of his crops. With regard to the structure of dung-heaps, I think they ought to be drained at the bottom, as you would drain your fields, and drain the liquid off into a tank. If you want to bring it into proper condition, watch it well; have it well spread out, and give it a drenching from time to time, once or twice a week. The thorough draining of your dung-heap is as beneficial as that of your soil. It is common with many farmers to turn their heaps; that is very expensive, and produces combustion, but if you freely drench it when you feel the smell of ammonia, it will soon become fit for application.

In answer to a question from a gentleman whose name we did not learn, Mr. Smith, of Deanston, explained the mode in which water had been conveyed over the farm to which he had alluded, viz., by pipes through the fields, and hempen hose 300 yards long. But they contemplated a great improvement on this mode: the mode in which they proposed to do it was by a jet, at an altitude of 180 feet. They had made an experiment to prove that by this means they could drench a circle to the extent of an acre. The pipes had hitherto been composed of cast-iron, but fire-brick clay pipes had been tested, and found to stand a pressure more than required, and which would only cost one-fourth the expense of iron piping.

Henry Lister Maw, Esq., of Tetley, said it was of very great importance to know how far the manures which the farmers themselves produced might be made valuable. He had four farms in his own management, the whole of which were originally in an exhausted state. Now, not only had the produce of these farms increased greatly, but the manure had accumulated to an extraordinary extent, and the success upon these farms had been productive of great benefit to the farms around. He was thoroughly convinced that, if the farmers would only turn their attention to the keeping of a stock, and the consuming of green crops, and would keep their cattle more in sheds at night and less in the field, their farms would become manufactories, the animals would feed the plants, and the plants the animals. Mr. Maw alluded to a discrepancy which he thought existed between the advice given by Mr. Smith and Mr. Thompson—one would exclude the air, and the other admit it. His own opinion was, that much air should not be admitted. He then said, farmers, if they wished to produce an abundance of good manure, must not be too particular about the appearance of their fold, for if they wanted to grow heavy crops of corn, potatoes, &c., then the stronger the manure the better. He had upwards of one hundred of cattle, and he was very particular that not a spoonful of manure should escape from the fold. The speaker, in conclusion, referred to what Professor Johnston had said with regard to the ash and the food of plants. He was of opinion that decomposed organic matter might act chemically on inorganic matter, and therefore produce a different effect. He, therefore, never allowed it to be burnt, and he had noticed a very great improvement on that soil on which he had prohibited burning, over that in which burning was carried on. It appeared to him of very great consequence that no misunderstanding should exist in the mind of the farmer as to the benefit to be derived from the application of manure. If the farmer was recommended to lay out his money in the purchase of guano, it was a serious thing to him if he did not get a sufficient return for his capital. His experience extended over between eight and nine hundred acres of land, and he was of opinion that if the stock of pigs or any other animals were sufficient to consume the whole of the vegetable produce on a farm, the manure produced would be greater than the requirements of the land in that respect, and it would be quite unnecessary to purchase guano.

Mr. Thompson perfectly concurred in the observations made by Mr. Smith, of Deanston, but he wished to explain that by the method of preserving the manure which he adopted, it could be rendered fit for immediate use in a very short time by admitting the air, while, by excluding the air, it could be preserved for any length of time, without deteriorating in quality. He placed earth at the top of the manure, as well as at the bottom of the tank.

Mr. Bowen said he had derived great pleasure from listening to the interesting discussion which had taken place; but as all farms had not convenient homesteads, it was desirable to know how to proceed in case of difficulty arising from that source. A homestead might be a hundred or two hundred feet below the level of the adjoining land, and how was the farmer, in such a case, to get the liquid drained to the upper part of his farm? (Hear, hear, and laughter). If any gentlemen could inform them how that was to be done, it would render him at least a great service.

Lord Portman said it appeared to him the tenant, in such a case, should request his landlord to put his buildings on the higher part of the farm. His lordship proceeded to observe that they had had an exceedingly interesting, practical, and scientific conversation, but it would not be convenient to prolong it to a much later hour. They had received, he thought, sufficient information for one night; and if they carried it home with them and acted upon it, they might very much improve their condition as farmers; but it appeared to him that in order to produce that result, co-operation was necessary between the tenant and the landlord. Having said this much, he would take the opportunity of recommending an attentive perusal of the valuable articles contributed by Mr. Huxtable to the Journal published by the society. That gentleman prepared his manure under cover, and had produced with it the largest crop of turnips ever grown. They had heard something of irrigation on the estates of the Duke of Portland, of which they would probably hear more hereafter. A gentleman in his county happened to have liquid manure in a good situation, and all he did was to open the tank door, and allow it to flow out over the land like a river, producing the most beneficial results to the land. In order to facilitate the range of liquid manure, sawdust might be advantageously employed. But it required to be done judiciously, an observation which applied equally to the application of all kinds of manure. In illustration of this point, he would relate an instance of injudicious application which had come under his notice. A farmer having heard that sawdust was destructive of weeds, resolved on applying it to a young thorn hedge, the consequence of which was that he destroyed not only the weeds, but the thorns also. His lordship urged the importance of education, and concluded by congratulating the meeting on the success of the present discussion, which would be followed up by similar discussions at any subsequent meeting of the society, and he had no doubt with the most beneficial results.

The meeting closed with cheers for Lord Portman. —Newcastle Courant.

MR. PARKES'S LECTURE ON DRAINING.

A meeting was held on Wednesday evening in the lecture-room, to hear a lecture by Mr. Parkes, consulting engineer, on draining. Lord Portman occupied the chair, and opened the proceedings by reminding them that they met for practical discussion—to hear a statement of the practical observation and experiments on the part of the members of the society; and he requested them to recollect that that was not a controversial discussion, but one of fact (applause).

Mr. PARKES read as follows:—

In fulfilment of the wish of the council of the society, and in anticipation that I, in common with its members, shall benefit by the remarks and larger knowledge of others, I have undertaken to appear before the present assemblage of agriculturists with the view of illustrating some of the principles and rules of practice in the art of land-draining. By so doing I do not think that I, or others who may follow me, shall be open to the charge of presumption, inasmuch as we may doubt if there lives the man, having acquaintance with the climate, soil, and agriculture of Britain, who would have the hardihood to dispute the assertion that drainage is beneficial, or the fact that vast districts in our island still require to be relieved from an injurious amount of water stagnant in its soil and stagnating too near its surface. I apprehend, therefore, that I may commence this paper by assuming—by taking for granted—unphilosophical and inadmissible as such a procedure would be in a doubtful case—that land-drainage is an art and a practice of acknowledged value and necessity; and that we are met here not to dispute about the propriety of draining wet lands, but simply to discuss the means of rendering the art of drainage efficient and economical, and to impart to each other our respective knowledge as to the modes of arriving at those desirable ends. I further apprehend that it should be our course to state, with precision, such practice as we may have severally pursued, its effects, and the causes to which the good or ill-success of the particular practice may, in our opinion, be ascribed. I imagine that we shall in this way best fulfil the object of the council in inviting this discussion, for I subscribe heartily to the doctrine enforced in the report of our council to the general meeting in May last, viz., that "a clear knowledge of cause and effect, under given circumstances, and a detail of the particular cases to which such knowledge is applicable, is, in their opinion, the only safe science to be recommended to their members." There is nothing contained in this declaration of the council to discourage experiment, as has been feared and suggested to me by some of its members—from which circumstance partly I refer to it—since "safe science," if the term has a meaning, is simply expressive of that determinate state of knowledge which is founded on facts; and we cannot obtain facts but through experiment, observation, and experience. Let me mention a definition of science as propounded by that illustrious traveller and philosopher, Alexander Von Humboldt, in his recently published work, "Cosmos,"* p. 71. He observes—"Science begins at the point where mind dominates matter, where the attempt is made to subject the mass of experience to the scrutiny of reason; science is mind brought into connection with nature." There is no difference in the sense of the two definitions; and the recommendation of the council will put the members at their ease who have information to add to the common stock, and will, I trust, absolve them and myself from all charge of egotism or desire of display, in speaking of our individual performances or opinions. Experience has demonstrated that a soil surcharged with water is incapable of perfecting crops—that excess of water is an impediment to the due mechanical division of the active soil—that it diminishes the fertilizing power of every species of manure—that it lowers the temperature of the mass of the bed—that it precludes the free entrance and change of atmospheric air—that it prevents the free descent of rain through the soil, and its timely evacuation. The existence of water in excess is far from being confined to those absorbent and tenacious descriptions of soil which have obtained the name of clays. My own observation of the soils of Britain leads me to the perception and belief, that fully as large an area of its extent, consisting of loams, and of earths still more silicious, need drainage quite as much as the stiff and compact clays. Water is permanently maintained too near the surface of many soils, whose natural texture for a few feet deep would allow to it a free passage downwards, were it not for the existence of a clay, or of some other impassable medium, at depths more or less great, which uphold water. The rivils referable to the excess of water in soils are rendered peculiarly apparent by comparing such water-logged land with those free, deep, naturally dry and warm soils, as they are called, which are so coveted by farmers, of which every one wants a slice, but which are so rarely to be met with, in comparison with the over-wet or too dry portions of the superfices of our island. The object of drainage is to assimilate the naturally wet to the naturally moist soil, in so far as that can be accomplished by so simple an operation, and its effect upon the texture and physical condition of wet land will be the greater or less according to the knowledge and skill employed in performing the operation. In a former paper on this subject, entitled, "On the Influence of Water on the Temperature of Soils" (Journal, vol. v., p. 119), I endeavoured to bring together and lay before the society a succinct history of the properties of water in its several states as a fluid, a solid, and a vapour or steam, and to show its effects upon soil, together with the action of other natural forces inherent in soil or dependent on meteorological phenomena. I need not again refer in detail to the points discussed in that essay, nor further than to express the conviction, that without a pretty clear knowledge of the nature of those bodies, forces, and phenomena—without, in fact, informing ourselves of the properties of the tools with which nature works, our own efforts and performances must be imperfect, and come short of the mark. A number of instances of draining, collected both previously and subsequently, and published by others as well as myself, induced in me a firm belief, in a very early formed opinion, that the general drainage then carrying on in this country was of a depth too shallow to realize the valuable results which a given expenditure of money was capable of effecting. Growing experience, with extended observation, have only served to strengthen my confidence in the superior efficiency of a deeper system of drainage; and the fortuitous discovery of the simple cylindrical pipe-conduit came in aid of those agriculturists and drainers whose convictions and practice were enlisted in the same cause. The society owes to Mr. Pusey the first announcement that there were such formed drain-tiles in use, in his paper, "On the evidence on the antiquity, &c., of thorough draining," published in the May Journal of 1843; and in the same year at the Derby show, Mr. John Read exhibited a few specimens of pipes. This was followed by an investigation into the use and merits of pipes made, at the instance of the council, by myself in Kent, and reported in the second part of the Journal of the same year. There existed only, at that time, a machine of a rude kind for manufacturing drain-pipes; but through the wide-spread information conveyed by the pages of the society's Journals, and the prizes offered by it for superior machines, we have arrived, in the short space of three years, to that agreeable dilemma which actually renders the selection in our show-yard of the most meritorious pipe machine a matter of no little difficulty. From a machine having the faculty of producing about 1,000 feet of pipes per diem, we have advanced, in less than three years, to the faculty of making 20,000 feet in the same time; in truth, the power of production by many of these machines is considerably, though usefully, greater than the requirements of any tilery. It may be also asserted that we have, during the same period, vastly enlarged our knowledge of the art of draining. We have come to consider, scientifically, what is meant by draining. Instances of the truest kind for guiding our judgment have been elicited from the practice of many farmers living in different counties, and occupying different kinds of soil; we have had collected and placed before us in juxta-position, the fact and the effects of drains made at different depths, not only in similar soil, but in the same field; we have the fact before us, well ascertained by various careful observers and practitioners, that lands which have been drained to a certain depth without effecting a cure of wetness, have entirely lost their dropsical habit when under-drained to a greater depth. The evidence, to my mind, is irresistible that a less depth of drain than four feet in any soil will not be accompanied by those beneficial results which we obtain at that, and in some soils by a still greater depth; and if time permitted, I should not doubt the bringing before you a mass of evidence, drawn from my own practical experience, as unimpeachable as it would be convincing, that drains executed to these depths are not only the most efficient, but the most economical, when the conduit is formed of cylindrical pipes. Before, however, entering on the detail of one or two interesting and peculiar examples of the effect of deep drains, I am desirous of making known to the society the opinions of an excellent author, the third edition of whose work was printed in 1652, and in which the recommendation and theory of deep drainage, as applied to water meadows and swamps, are so clearly and powerfully laid down, that it would be difficult to give them in better language. It is right, too, to assign the merit of discovering, or of the earliest assertion of sound practical principles to whomsoever we may consider to be entitled to the praise. The author of this work was a Captain Walter Blith, signing himself "A Lover of Ingenuity;" it is quaintly entitled "The English Improver Improved; or, The Survey of Husbandry Surveyed:" with several prefaces, but specially addressed to "The Right Honourable the Lord General Cromwell, and the Right Honourable the Lord President, and the rest of that most Honourable Society of the Council of State." In his instructions for forming the flooding and draining trenches of water meadows, the author says of the latter—"And for thy drayning trench, it must be made so deep that it goe to the bottom of the cold spewing moyst water, that feeds the flagg and the rush; for the widenesse of it, use thine own liberty, but be sure to make it so wide as thou mayest goe to the bottom of it, which must be so low as any moysture lyeth, which moysture usually lyeth under the over and second swarth of the earth, in some gravel or sand, or else, where some greater stones are mixt with clay, under which thou must go half one spade's graft deep at least. Yea, suppose this corruption that feeds and nourisheth the rush or flagg should lie a yard or four foot deepe, to the bottom of it thou must goe, if ever thou wilt drain it to purpose, or make the utmost advantage of either floating or drayning, without which thy water cannot have its kindly operation; for though the water fatten naturally, yet still this coldnesse and moisture lies gnawing within, and not being taken clean away, it eates out what the water fattens; and so the goodness of the water is, as it were, riddled, screened, and strained out into the land, leaving the richnesse and the leannesse sliding away from it." In another place he replies to the objectors of floating that it will breed the rush, the flagg, and the mareblab: "Only make thy drayning trenches deep enough, and not too far off thy floating course, and I'le warrant it they drain away that under moysture, fylth, and venom, as aforesaid, that maintains them, and then believe me, or deny scripture, which I hope thou darest not, as Bildad said unto Job, 'Can the rush grow without mire, or the flagg without water?' (Job viii, 12.) That interrogation plainly shewes that the rush cannot grow, the water been taken from the root; for it is not the moystnesse upon the surface of the land, for then every shower should increase the rush, but it is that which lyeth at the root, which, drained away at the bottom, leaves it naked and barren of relief." The author frequently returns to this charge, explaining over and over again the necessity of removing what we call bottom water, and which he well designates as filth and venom, observing—"I am forced to use repetitions of some things, because of the suitableness of the things to which they are applied; as also because of the slowness of people's apprehension of them, as appears by the non-practice of them, the which, wherever you are so drayning and trenching, you shall rarely find few or none of them wrought to the bottom." As to the distance between the draining and floating trenches, he prescribes no certain rule, saying—"If the land is sounder and drier, or lyeth more descending, thou mayest let it (the water) run the broader; and as thy land is moyst, sad, rushey, and level, let it run the less breadth or compass;" thus exhibiting a far more correct and intimate acquaintance with his subject than is often to be found among the water meadow artificers of the present day. Our author gives a most just account of the cause of those boggy places and swamps so often formed on the slopes of hills, and at their foot, and describes the mode of treating them, so as to effect a perfect cure, which coincides with the best practice of the present day, always insisting on making deep excavations into the eyes of the springs, &c. But I fear to be tedious, and therefore refrain from this quotation. For all drainage purposes he reprehends shallow trenches, observing, in respect to bog drainage—"But for these common and many trenches, ofttimes crooked too, that men usually make in their boggy grounds, some one foot, some two, never having respect to the cause or matter that maketh the bog; I say, away with them as a great piece of folly, lost labour, and spoyle, which I desire as well to preserve the reader from, as to put him upon a more profitable experiment: as to destroying the bog, it doeth just nothing, only taking away a little water which falls from the heavens, and weakens the bog nothing at all, and to the end it pretends is of no use." Finally, he describes—admitting such work to be more expensive, but more efficacious and durable—the use of deep covered drains, placing at the bottoms of the trenches "good green faggots, willow, alder, elm, or thorne;" or, in firmer stuff, "pebble stones or flint stones, and so fill up the bottom of thy trench about fifteen inches high, and take thy turf and plant it as aforesaid, the green soard downwards, being cut very fit for the trench, so as it may joyne close as it is layd down; and then having covered it all over with earth, and make it even as the other ground, waite and expect a wonderful effect through the blessing of God." He prescribes also, in all cases excepting for water meadows, the driving the drains right up and down the fall of the land. In this account of draining water meadows and swampy lands, one cannot but recognize very sound principles, and these are represented by Captain Blith as having been put into practice by himself, copied by others, and as having raised the value and rent of land so treated from a few shillings, to two, three, and four pounds per acre. There is no indication in this work of any system of under-draining, or of thorough-draining (as it has been recently termed) general wet soils, the author referring to the "incredible expense" it would occasion, and he prescribes in this difficulty the ridging up wet clay lands or the laying them in balks. As no instance or "precedent," as Captain Blith terms it, of any general under-draining is referred to by him, we may, I think, conclude that this practice had its origin within the last 200 years, struggling onwards to perfection through the difficulties presented by the absence or expensiveness of good materials wherewith to form permanent water-conduits. In the course of my operations as a drainer, I have met with, or heard of, so many instances of swamp drainage executed precisely according to the plans of this author, and sometimes in a superior manner—the conduits being formed of walling stone, yet at a period long antecedent to the memory of the living—that I am disposed to consider the practice of deep drainage to have originated with Captain Blith, and to have been preserved by imitators in various parts of the country; since a book which passed through three editions in the time of the Commonwealth must necessarily have enjoyed a high reputation. I find, also, not unfrequently, very ancient deep drains in arable fields, and some of them still in good condition; and, in a case or two, I have met with parallel drains six feet deep, but placed at so great a distance asunder, as not to have commanded a perfect drainage. The author from whom I have so largely quoted is the earliest known to me, who has had the intelligence to distinguish between the transient effect of rain and the constant action of stagnant bottom-water in maintaining land in a wet condition. It is this subterranean water, as it may not be improperly termed, to which excessive and injurious wetness is attributable; and if such bottom-water be not removed and kept down at a depth below the surface, exceeding the power of capillary attraction to raise it, no drainage can be efficient. It is this force combined with the absorbent power of the earths which chiefly maintain those soils in a sufficiently moist state for vegetative perfection, on digging into which we do not discover any free water within several feet of the surface. The effect of rain is to thoroughly moisten such soil, gravity carrying down below the excess, or that portion which the soil cannot absorb or retain. Evaporation takes place from the surface of the land, and as each atom of moisture is taken up into the atmosphere, its place is supplied by another atom communicated by the contact of the particles of soil, the more superficial acting on the deeper particles like so many pumps to elevate the water and supply the loss. In this way the deep, rich loams, to which I have before adverted as so rare and so coveted, are maintained in a nearly constant condition of moisture suitable to the necessities of plants. It may, and does, though rarely, happen, that even such soils during long-continued droughts suffer, that is, become too dry; but the attentive observer will notice a very beautiful and powerful provision of nature to prevent excessive dryness. During the night evaporation from the surface of soil commonly ceases, to commence again when the rays of the sun impinge upon it; but capillary action is constant, and of equal intensity both by night and by day, so that we have, on the average, 12 hours per diem of the sun's influence to produce evaporation, and 24 hours of capillary action to supply the loss from below, and maintain a tolerably uniform hygrometric or moist condition of soil. It is, I believe, consistent with the universal opinion that drained lands do not burn, nor suffer from drought so soon or so much as those soils which are wet at all periods of the year, except during the hottest months. This phenomenon is explained by the fact of a retentive soil swollen by water contracting so much by the loss of its water, that it is almost inaccessible to air from which to obtain moisture. After drainage, the physical texture of such soils becomes gradually changed: pulverization takes place in the subsoil in a manner precisely similar to the change we see produced in fresh turned-up soil well exposed to the atmosphere: such change of texture in the mass below is doubtless slower than in the superficial soil, but it is equally certain to occur. Perhaps no more striking illustration of the great importance of securing free ingress to air and free egress to water in the mass of the soil can be given than that which is derived from the fact that by allowing land to rest without cropping it—in short by fallowing it—fertility is renewed, and this effect is produced solely by supplies furnished from the inexhaustible magazine of the atmosphere. The atmosphere is our cheapest, it is a boundless storehouse of manure; then why not let it freely and deeply into our soil? The earnestness with which I appeal to the landed proprietary of Britain to drain deeply, and abandon the next to abortive system of shallow drains, is derived from the indications of experience; and to those well informed of the superior economy and efficiency of the deeper system, it is painful to behold the sums of money daily buried in the soil with such good intentions, but with comparatively so little useful effect. The following is an instance of the utility, the necessity I ought to say, of looking deep into the soil, of ascertaining, in fact, what we have to deal with before commencing drainage. I shall relate as briefly as possible the circumstances of the case to which I am about to allude. It will show you the necessity of looking deeply into the land which you intend to drain. I was invited a few months ago to visit the property of the Duke of Wellington, at Strathfieldsaye; and as one instance—but as one of a thousand—I will relate to you the extreme importance of looking deeply into the soil, and taking away the bottom water. While I was looking into the estate in February last, I found more water than in anything which I had ever trod upon except on a bog, or stiff retentive clay (hear). Thousands of pounds had been laid out in draining this estate without doing much good. I inquired the depth to which the drains had been put down, and I found that in some cases they were only a few inches, whilst in others they were two feet, three feet, and in one case three feet six inches deep. The land was absolutely so wet that the horses passing over it sunk to their fetlocks. I was taken to a field, and I asked the people then employed in draining if they were acquainted with the depth of the clay, and they said it might be 100 yards deep, and they might not get water till they got there. I thought it was as well to ascertain the fact, and I got men to bare off the surface to the depth of six feet, and when we got twenty-two inches down we came to a very beautiful bed of plastic clay, called by geologists "London clay." Until we had dug down about three feet into this clay, not a drop of water came into the hole; but when we got six or seven inches deeper, the hole was immediately full of water. I immediately conceived that I saw where the water came from. The land had never been drained to this depth. Drains had been made to the surface, but these drains could not take away the water beneath them; and as this clay laid upon a pool of water, it was impossible that the clay could ever crack, and let the water out. The clay would absorb the water below, and its cracking would thereby be prevented; and a three feet drain, therefore, could not absorb the water. I first requested that a drain should be made on a peculiar plan. I had an outfall of sufficient depth to enable me to lay in a drain five feet deep, and I did so. Then, in order to put the soil as nearly as possible in the condition in which it naturally was, I caused the trench which had been opened out to receive the pipes to be plugged up with the original clay, and a second line of draining laid in the same direction, and determining in the same outlet; so that, as there would be water in both, I could determine the quantity of water conveyed away in each separately, or in both conjointly. There are some causes of stoppage to subterranean drains, though fortunately few and limited in their extent, with which every drainer should be acquainted, and prepared to encounter and vanquish, as he best may. The first and most extensive evil of this kind to which I will refer, is the deposit of a substance of an unctuous sticky nature, in drains laid in soils containing much ferruginous matter. On this point I was particularly questioned by his Grace the Duke of Richmond, chairman of a select committee of the House of Lords, appointed last year "to inquire into the expediency of a legislative enactment being introduced to enable possessors of entailed estates to charge such estates with a sum, to be limited for the purpose of draining and otherwise permanently improving the same." I was asked, "Do not stone drains invariably clog if there is water in them impregnated with iron?" My reply was, "I have no doubt that the ferruginous matter, such as I have often seen accompany the water of drainage, would stop up stone drains;" and, in conversation, his grace informed me that he had estates in Scotland infested to such a degree with ferruginous matter, that the deposit of iron in drains seemed an almost invincible obstacle to the drainage of these lands. Since that time, and in various parts of England, my attention has been practically and specially required to discover the cause, and, if possible, a cure for this disease. I will narrate what I know on the subject. When applied to by Sir Robert Peel last autumn to drain some portions of his estates at Drayton manor—and he knew that my system consisted in the use of small pipes in preference to other conduits—he earnestly called my attention to this cause of stoppage, which had been a continued source of vexation, expense, and defeat in draining the park and other parts of the property. Sir Robert accompanied me throughout the grounds to be first drained, and showed me the evidences of this red deposit at the mouths of drains, and the spewing masses of it on ditch banks, &c., leaving me to deal with the enemy according to my judgment. It will be conceived that I felt the full force of the difficulty, and there was but little experience, so far as I knew, of the use of small pipes in soils similarly infested. Yet I had confidence in pipes, as preferable to all other conduits, from the compression of the run of water into the smallest required volume, and therefore as more likely to prevent deposits from occurring or accumulating than larger conduits. I was acquainted with one case, and one only, in which very small pipes, an inch bore, had been used, and have continued to act well for several years without obstruction, in a boggy soil charged with iron, though the ditches into which the pipes, always running full bore, discharged their water require clearing once or twice a year to keep them open. I also felt additional confidence in the sufficiency of small pipes, as I proposed laying them with collars, which would further help to cover and diminish the size of the crevice between each pair of pipes, and close it against the entrance of solid matter. However, I devoted an entire week to the examination of old drains, many of which were quite stopped up with earth and iron deposit mixed: of these some were composed of the common horse shoe tiles laid without soles, and others with soles. The drains through which water was continually running were chiefly open, having great quantities of the deposit at their mouths; and one drain, formed of six-inch pipes, conveying much water, exhibited the iron copiously as a precipitate when the line was broken and a pipe removed, which exposed the water to the atmosphere. Cesspools communicating with the atmosphere at top, and into which some drains entered, were also lined with deposit. I examined several drains serving as mains, and particularly at their point of junction with minor drains, and I found one of these drains about six feet in depth, and very well constructed, to be nearly closed with what appeared to be a pure specimen of the deposit; having the red colour of peroxide of iron, and of a pasty texture. This particular mass of deposit had occurred at the junction of a branch with the main, about thirty or forty yards from the higher end or origin of each drain, and where the run of water would necessarily be greatly less than as it approached the outfall; and I have found at Drayton Manor, and many other places, where ferruginous matter abounds, that stoppage from its deposit is much more frequent towards the higher than nearer the outfall end of a line of drain; and for the very obvious reason, that the flow of water there is greatly less both in quantity and velocity—and, consequently, in force—than it is as it approaches the end of its course. This specimen was analyzed by Mr. Richard Phillips, of the Geological Museum, Craig's-court, London. Mr. Phillips at once told me it was peroxide of iron; but I wished it to be analyzed, that I might know whether, and to what extent, the iron was pure or incorporated with other matter. The following is Mr. Phillips's report of its nature and of the manner of its production:—

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* Cosmos: a General Survey of the Physical Phenomenon of the Universe. Baillière, 219, Regent-street, London.

"Museum of Geology, Dec. 13, 1845.

"I have submitted the deposit occurring in the drainage pipe to analysis, and I find it to consist of, after drying—

Silica and alumina, with a trace of lime	49·2
Peroxide of iron	27·8
Organic matter	23·0
	100·0

The large amount of peroxide of iron shown in the above analysis appears to me to be in consequence of the iron existing originally in a lower state of oxidation, in which state it has been dissolved by carbonic acid, and formed by the decay of organic matter in the soil, and then carried away by the drainage water; when, by subsequent exposure to atmospheric air it has been converted into insoluble peroxide. The other ingredients in the deposit would appear to have been carried down mechanically, in consequence of their existing in a very minute state of division."

It thus appeared from the analysis that only 27·8 per cent. of the deposit consisted of iron; and that the remainder, nearly three-fourths of the whole, consisted of foreign matter. This analysis powerfully fortified my hopes that the drains I was making might remain permanently open, if their mechanical structure were such as to admit water only, and no other earthy matters than such as might be chemically dissolved; in which case it was apparent that I should reduce the enemy to be contended with by nearly three-fourths of his strength, and direct against him, for expulsion, a more concentrated stream of water, by reason of the smaller dimensions of the conduit. Between November last and the present time, some miles of drains have been executed in the soils referred to, abounding with bog-iron ore, locally called "pox stone," the same as I have met with in North Devon under the name of "black-ram," and in Somerset under the title of "iron-mould." In other parts it is called by its proper name. It occurs in masses, both large and small: sometimes in beds. It is intensely hard, and interferes much with both the economy and dispatch of digging the drains. It is the protoxide of iron of the chemists, and furnishes by its fine dissemination in the soil the matter dissolved by means of carbonic acid in the water which enters the drains, becoming peroxide in the manner described by Mr. Phillips. The term "iron," or "rust of iron," would convey to the mind an idea that this ferruginous matter was heavy, and would quickly settle; but when it is considered that all substances chemically dissolved by water and precipitated are infinitely fine, each atom is, in a practical sense, light, and easy of removal; and, in reality, this substance is seen to issue from the mouths of drains in the form of light, flocculent, floating little masses, which settle when the water is quiet, or are easily brought to rest by stodes, grasses, &c.; and this has actually given rise to a notion with some people that it was a vegetable substance, and grew in drains. Up to the present time not a trace of this ferruginous matter is to be discovered at the outfall of any one of the pipe drains laid at Drayton Manor; there is not even a stain of its presence visible on the end of any of those pipes which discharge into open ditches, and where it might be expected to exhibit itself; nor have I yet observed any deposit of the substance in the ditches. So far, the result is very encouraging. The time, however, has been too short to permit us to indulge in absolute certainty as to their permanent action; yet I may mention one or two circumstances as confirmatory of the fact that earthy matter does not enter the pipes, and that therefore nothing has to be dealt with but the iron. There is no appearance of any sand or other earthy bodies having accompanied the water of drainage, which is brilliantly clear; and in one field where I had the opportunity of continuing a line of pipes through the field into a head of water which I could stop out, or allow to flow through the drain 290 yards long, at will, no sand was washed out by it, thus giving proof that none had entered the drain with the water of drainage. I do not feel to be thoroughly or sufficiently acquainted with the phenomena attending this drainage, for although my previous confidence in the non-transmission of earthy matter by the collared pipes has been strengthened, as well as the expectation that the flow of water in the confined channel would sweep out any fine rust of iron which might be deposited therein, I do not yet, however, understand the absence of the appearance of iron deposit at the outfalls of these drains. Time and observation, assisted by an analysis of the issuing waters, which has already been commenced, and the drawing the attention of chemists generally to the subject, may, I hope, by enabling us to detect causes, teach us how to improve effects. The subsoil generally in Drayton Manor Park consists of gravel intermixed with fine and very heavy sand alternating with, or broken in places by, a marly clay very retentive of water. It contained much water, our test holes standing full in the winter, or within eighteen inches of the surface throughout. It was chiefly by the pick-axe that the trenches had to be opened, spades being of little use in the gravels. The sides fell in and closed so much that it was difficult, and in some parts impossible, to keep an entire line of drain open before the pipes were obliged to be laid, so that the worst parts had to be done by instalments, the pipes being laid and covered up as the work proceeded—for, if not so done, the spewing sand was forced up from the bottom and through the sides by the pressure of water. All was secure, however, when the collared pipes were laid in their packing, for which fern was used; when we could procure it, clippings of laurel and fine fences. One drain, about 105 yards long, was laid in a quicksand, by using inch pipes completely sheathed in another larger pipe, and no packing or cover was employed. This drain, which is about 6 feet deep, has never exhibited, at its outfall, a grain of sand: the water is beautifully pellucid, and has maintained a discharge, varying, however, with rain or drought, of about two gallons per minute. I conceive this method of sheathing pipes to be capable of forming a permanent drain through any species of quicksand or loose soil; packing may be a useful and even necessary adjunct in certain very fluid and fine media, but when a drain thus formed is carefully laid and filled in, my belief is that it will resist the entrance of all matter, except water. To use the apt expression of one of my workmen, nothing else can get in when "the water sighs into the drain so quietly." Another cause of obstruction to drains is the entrance into them of the roots of trees and plants. Of the former, several cases have been reported to me as having occurred, and probably no species of close under-drain yet constructed can be considered to be absolutely safe from the roots, if laid within the range of their travels; and the great distance from the parent tree, to which roots will travel in search of food, is well known to every agriculturist. It would be venturing too much to say that a root will not enter drains by any, even the smallest conceivable crevice or pore, which will admit water; for cases have been mentioned to me almost justifying the belief that roots have insinuated themselves through Roman cement. They seem, however, to be very capricious and choice in their attacks, for I have seen drains which have continued perfectly free in their action for years, adjoining fences and plantations, whilst a drain at a greater distance has been choked by roots. In the two or three cases observed by myself, I have found that a single thread-like root alone has entered, and then worked its way up against the run of the water, increasing into a hairy mass, something like the brush of a fox, and growing in length sometimes to several yards, until it closes the drain as completely as if it were stopped full of clay. I have repaired a drain 6 feet deep, thus stopped in a small plantation at Drayton Manor, by the root of a young chesnut tree, by using 2 inch pipes 2 feet long, and collaring with pipes 6 inches long with cement; but this serves only as a conduit, and is not intended to act as a drain. I have also laid drains on each side of a road, having a row of trees within a very few yards of them, with sheathed pipes, not cemented, as they are wanted as drains. In situations where close drains must be laid near to trees, I would advise the keeping as far off as circumstances permit, and the providing each row of pipes, if joining a main, with a cess-pool at their junction, in order that the discharge may be visible and examined occasionally, which would soon detect a stoppage if it occurred. But it will be wise in all cases, if people will have hedge-row trees, that the drainer so plan his operations as to keep as wide of them and fences as possible—but, better still, to get trees felled wherever they occasion a feeling of doubt as to their affecting the permanency of the drainage, or cause it, in respect of the direction or depth of the drains, to be other than complete. If trees, as in parks, are in the way of drains, I advise the sheathing of the pipes on approaching within 20 yards, and I frequently diverge from the line and pass round the tree, to regain the true line of drainage. With stoppages from the roots of plants I have only very recently become acquainted, but this evil does occur, though fortunately it is of very rare occurrence. The first case known to me took place this year in a field on an estate of Mr. W. Wolryche Whitmore, at Lebotwood, in Shropshire. A tenant of his laid a pipe-drain last March in a boggy piece of ground very wet and spongy, which was sown with turnips. The drains were found in many places to be completely stopped with very fine roots in October. It seems to be difficult, indeed impossible, to pronounce from what plant these roots proceeded. I sent specimens of them to Professors Lindley and Daubeny, who kindly examined them; but neither of these botanists are able to decide on the parent plant, to which the roots unfortunately were not traced when the pipes were taken up. The drains were shallow, not exceeding 2 feet 6 inches deep anywhere. The boggy soil contained many sorts of weeds, as crowfoot, coltsfoot, rushes, and docks, of which there was abundant evidence when I was on the spot some weeks afterwards. The pipes sent me contained much earth, which had got into them, with the roots, and I understand that several of the pipes were almost stopped with soil alone, but it is also true that others in which the roots had worked were free of earth. From all the evidence I could collect on the spot I am disposed to consider this stoppage by roots to have originated in bad laying of the pipes by the farmer, and insufficient depth in a very foul piece of land. It is, however, a case of warning, and one to excite vigilance of observation. I have now a drain laid deeply in the same soil with pipes collar-jointed, and other drains to test any difference in future action and phenomena. Mr. Scarth, agent to his Grace the Duke of Cleveland, has reported to me a case of stoppage by roots in the middle of a grass field, far away from trees and hedgerows, of which here is a specimen. It occurs in the fields about Raby Castle, and is a source of great annoyance. I took a specimen of these roots to Professor Lindley, who has kindly undertaken to examine them, but it is to be hoped that when the next stoppage occurs Mr. Scarth will be able to trace the roots up to the plant. Mr. H. S. Thompson, of Moat-hall, near York, has mentioned to me some cases of stoppage of drains on his estate by plants or roots, which he has kindly undertaken to investigate minutely, and will report the particulars to the meeting. A case of a drain three feet deep, stated to have been stopped by the roots of a wheat plant, has been mentioned to me, and another by turnip roots. I am not disposed to think that drainage causes roots to strike deeper, provided the active soil be in good heart and condition. After Mr. Hammond, of Penshurst, had underdrained the piece of hop ground referred to in my report on small drain-pipes (Journal, Vol. IV.) in 1843, I requested him to examine if the roots of the vines had descended more deeply in consequence. He answered in the negative; and as hop grounds are well manured on the surface, and are annually forked to about the level which the roots assume below the surface, namely, about eight inches, and the whole space between the rows filled with a horizontal mass of fibre, there seems no reason to expect that they should seek a poor meal below, when a rich one is provided above. It is important that every case of the stoppage of drains from the entrance of roots should be well investigated; but we may rest quite satisfied, from our long experience of under-drainage, that instances of this evil will only be of casual, and, probably, of merely local occurrence. With the exception of the one case cited, I have not heard of the occurrence of a single case of root stoppage in pipes; but it is evident that if the roots of weeds or cultivated plants were in the habit of preferring to burrow in a drain rather than in the bed of the soil, a pipe drain would be as liable to be choked as any other form of drain. I will now refer to one or two natural aids to drainage. Besides the porosity of soils, by which they receive and part with water more or less readily, according to their openness or retentiveness, there are other adjuncts or means auxiliary to its reception and discharge. It has not occurred to me to excavate many clay soils for drains, in which there are not perceptible what experienced and observant drainers aptly call water veins. The clay is divided, as it were into plates, masses opening or parting from each other like the leaves of a book, between which, thin as the vein is, an evident passage of water has taken place. These partings may have been originally occasioned by vertical cracks from the surface, which have never entirely closed again, and so served to conduct away some of the rain water to more porous and absorbent strata. It is a matter of fact that in all clays in which these water veins occur in the greatest number, I have found drainage to be effected the most speedily, and I practically use the perception of their presence as some guide to the distance at which I determine to place the drains from each other. But the most active and potent of the drainer's auxiliaries is the common mining earth or dew worm. The earliest written notice which I have seen of the utility of the earth-worm in drainage is to be found in Mr. Beart's article on draining (Journal, Vol. IV., p. 212), in every word of whose remarks I concur. Earth-worms love moist but not wet soils; they will bore down to, but not into water; they multiply rapidly in land after drainage, and prefer a deeply dried soil. On examining with Mr. Thomas Hammond, of Penshurst, Kent, part of a field which he had deeply drained, after long previous shallow drainage, we found that the worms had greatly increased in number, and that their bores descended quite to the level of the pipes. Many worm bores are large enough to receive the little finger, and it is possible that one worm has several bores for his family, and refuge holes from rain. I have very recently found worms twisted up into knots, and berthed in a nidus formed by the side of the vertical bore, and in communication with it by a lateral hole about an inch long, forming in appearance a comfortable retreat. My valued and much lamented friend, Mr. Henry Handley, informed me of a piece of land near the sea in

Lincolnshire, over which the sea had broken, and killed all the worms, the field remained sterile until the worms again inhabited it. He also showed me a piece of pasture land near to his house in which worms were in such numbers that he thought their casts interfered too much with its produce, which induced him to have the field rolled at night in order to destroy the worms. The result was that the fertility of the fields greatly declined, nor was it restored until they had recruited their numbers, which was aided by collecting and transporting multitudes of worms from other fields. The great depths into which worms will bore, and from which they push up fine fertile soil, and cast it on the surface, has been admirably traced by Mr. C. Darwin of Down, Kent, who has shown that, in a few years, they have actually elevated the surface of fields by a layer of fine mould several inches thick, thus adding to the pabulum of the grasses. His experiments were made at Mr. Wedgwood's, of Etruria, and are recorded in the *Gardener's Chronicle*, of April 6, 1844. Mr. Darwin's researches are entitled to the strictest credibility. Here are some specimens of warp soil now undergoing drainage by me on an estate of Mr. William Marshall's, M.P., near Patrington, fourteen miles east of Hull, and opposite the well-known tract of land, reclaimed likewise from the Humber, called Sunk Island. When first examining this soil for drainage, I was struck with the astonishing number of fine vertical holes penetrating the warp to its full depth in some places eight to ten feet. These holes were evidently not the work of earth worms, being of a much smaller bore, and worms abound in that soil, and were at work in their own fashion, though no other living creature was discernible. Very many of these minute holes seem to be fully appropriated by the fine roots of plants which descend into them, and thus find easy access to moisture and air. On further investigating into the origin of this network of holes, it was traceable beyond a doubt to the existence and activity of myriads of small marine animals, and minute eel-like-looking fish working in the mud of recent deposition. The tidal stream from the Humber, which is conducted upon the warping grounds, and let out again with a retiring tide after the deposition of its solid matter, does not destroy the life of these creatures, nor close their cylindrical habitations. On the retirement of the water they are to be seen ceaselessly occupied in working up and down their holes, further to maintain and elaborate them against the next invasion. The death of these amphibious animals no doubt occurs when the process of warping terminates, and the soil solidifies, but their holes remain entire and open from the top to the bottom of the moss, serving to admit air and moisture, and to pass the water of rain in finely divided streamlets to the drains, and the earth worm finally establishes himself in a soil easily penetrated and most congenial to his mining habits. In the field of warp first begun to be drained on this estate, I have set out the drains at about fifty feet asunder, their depth varying from four to six feet, as outfall permits; but it is probable, as experience is gained of the draining faculty, that we may see fit to diminish the number of drains, and so increase their distance from each other in these soils. The alumina of the Humber warp is very firm, and very retentive of moisture. Water appeared at 18 in. below the surface after a month of powerful evaporation and drought in May and June of this year, and copious streams were discharged from the deep drains. In its original state of wetness, but under circumstances of drought, this soil cracks widely and deeply like the stiffer clays, so that it seems to possess every facility for the most complete drainage, whilst its facility for absorbing moisture from the air, and by capillary attraction from below, are of the highest order and qualities, which must vastly aid in conferring upon it the fertility well known to attach to warp lands. But the quality of warp varies greatly, according as the deposit takes place in different parts of the same stream, and at greater or less distance from the warping river's mouth. I cannot perhaps mention a more remarkable instance of the difference in the properties of warp, than what occurs at Bridgewater, in Somerset. The river Parrott is famed for the almost evergreen fatness of the pasturage bordering its banks—sands which were formed originally, it may be presumed, when that river was an estuary of the sea far inland. Its deposit immediately in the neighbourhood of Bridgewater has occasioned a great manufacture of very superior bricks and earthenware; and there is one article of almost universal domestic use called the Bath brick, for cleaning knives, &c., made at Bridgewater only, and it is singular that the sludge or mud from which these bricks are made is collected from the river Parrott's banks, within about a mile above and a mile below the town of Bridgewater. The banks of those particular two miles of the river alone afford the precipitate fit for the manufacture of the Bath brick. The deposit formed, whether more inland or more seaward, is found to be unfitted for the purpose. So, in the warped lands formed from the water of the Humber, whether passed immediately from that river, the Ouse, or the Trent, great difference in the quality of the deposit and fertility in the soil in respect of the proportions of clay, sand, and salt, is discernible and well known. Great difference also exists as to the necessity of draining warped lands, arising from the depth of warp, the character of the subsoil on which the warp is run, and the particular composition of the warp itself in its proportions of clay and sand. Near to the mouth of the Humber it strikes me that there is a much larger proportion of alumina (clay) deposited, in respect of silica (sand) than about Goole, Thorn, and other warping districts. There is no doubt also much more common salt in the composition nearer to the Humber mouth. The quantity of salt in which the wheat plant will flourish is curiously illustrated in the warp soils about Patrington, and would be scarcely credited unless seen. The whole surface of a large reclaimed warp piece on Mr. Marshall's estate was planted with wheat for the first time in the autumn 1844. When I saw it in the autumn of 1845, the surface of the ground was crystallized all over with salt, evidencing the enormous quantity which the mass of the bed must have contained; yet, from this first crop the tenant told me he had thrashed out 24 bushels per acre. The order of culture there, after warping, is to leave the land to the occupancy of what is called the sheep grass, which naturally skins it for three years, when that begins to die off. It is then ploughed up, and sown with rape, and allowed to go to seed. This plant is considered to remove the very injurious excess of salt, and great crops of it are obtained. Wheat follows, and after that, any other crop to the farmer's liking, without regard to systematic rotation, may be produced. But the whole of this land is much too wet; it is too salt, and its powers will not be appreciable until after deep and complete underdraining. It appears, however, that the lands warped at a greater distance from the mouth of the river must be skilfully treated in respect of under-drainage. A complete power of deep under-drainage should be established to withdraw the water, to keep it down low beneath the surface when injurious; whilst there should be provided means of sustaining water nearer to the surface and to the roots of plants, when under the influence of such a dry season as was experienced in 1844. In many of these warped lands means exist to fulfil this end, as water is raised out of the ditches by machinery when in excess, and the height of water in the ditches is maintainable by drawing it from the high land drains. A farmer, residing near to Hatfield Chase, informed me that he considered he saved crops of the value of 1,500*l.* in 1844 (when it will be remembered we had 14 weeks of hot sun, without a drop of rain), by his command of water to charge his ditches. The warped lands are very commonly divided into fields of 10 acres, being squares of 220 yards, surrounded by open ditches, and it is considered that the water is thoroughly drawn out of the soil to the level maintained in the ditches: but this I much doubt, and am satisfied from my observation of these flat warped lands, both in wet and dry weather, that they would be astonishingly benefited by a system combining both sub-drainage and sub-irrigation; but it is possible that the farmer may have reason for not draining this soil more deeply or more completely, unless means are provided for sub-irrigation in droughty seasons. There has been rather recently introduced by some drainers a practice of making what they term air-drains, with the view of providing for a ventilation of the soil, and also for promoting, as they think, a freer flow of water from drains. As regards the latter point, it is quite certain that such air-drains must be superfluous and unnecessary. The fact of water entering subterranean drains at all is quite decisive, as to the universal presence of air in soil; and no one has shown or has attempted to show, so far as I know, its insufficiency. Water could no more issue from a drain laid in the earth, than it could flow from a tight barrel, if air did not press on the surface of the liquid within it. Every one knows how small a vent-hole at the top of a cask suffices to enable us to withdraw a great stream from it at the bottom, and every one knows that the bulk of liquid discharged in a given time is in quantity precisely equal to the volume of air which enters in the same time. The fact of rain-water sinking through the soil is demonstrative of the perfect permeability of that soil to air, as every drop of water which falls from the heavens must first displace an equal volume of air before it can enter the soil; the water would remain on the surface, and never sink if, by reason of its superior gravity, it did not push aside the air in its descent, which it does until it meets with some subterranean level where the earth is saturated with the fluid, and the rain-water then comes to rest, having disturbed and displaced air throughout its whole downward course. And by this action we are led to observe one beautiful provision of nature for renewing the constituent air of the soil, and I regard it as an argument in favour of deep, as compared with shallow drainage—that a greater bulk of earth is thereby filled with air, and with frequently renewed air. There are other equally beautiful processes incessantly active to maintain a full supply, and fresh supplies, of air in the soil. The continual change of temperature in the soil, and in the atmosphere reposing upon it, has its effect; but probably the most potent cause is the unceasing appropriation by plants, or manures, or soil, of some one or other of the three gases of which the atmosphere is composed. A renewal of the particular atmospheric gas issued, whether it be oxygen, nitrogen, or carbonic acid, must be nearly consentaneous with its use, and is effected by the well-known principle of the diffusion of gases, and without which neither plants nor animals could live.

In answer to a question from a gentleman present,

Mr. Parkes proceeded to give an explanation of the several tools which he uses in drainage. He exhibited several scoops, of different sizes, the object of which is to make a place for the pipe exactly its size. He had made repeated experiments in the formation of these scoops, and he believed he had got them now perfect. They are made of steel upon iron, by which they were always kept sharp, and rendered it unnecessary to take the tool to the grindstone. He also exhibited an article by which he lays the pipe. It is of the form of a stopper, and about half the length of the pipe. He also dwelt upon the use of the collar, in connecting the separate pieces of pipe together, and showed the utility of the cesspool which he exhibited to the meeting. The pools are made of the same materials as the pipes, and were sufficiently portable to be used by the drainer himself, and thus setting aside the necessity for a bricklayer. The cesspool was useful for ascertaining the extent of water flowing through separate drains, which might meet at one place. By means of these pipes, he could also bottle up the water, and produce a sort of sub-irrigation, by which he could moisten the roots of the plants, and avoid the throwing of water upon the leaves. Mr. Parkes also explained the use of a valve, for the purpose of stopping the entrance of dirty water. He referred to some experiments which he had made, in support of the usefulness of those several articles which he had brought into the service of drainage.

Mr. Marshall opened the discussion, by observing that when Mr. Parkes came to drain lands, he brought with him skilled workmen, who had been accustomed to it in various places. These men were brought in sufficient numbers, so as to direct the drainers in the neighbourhood, who were accustomed to the old ordinary style of draining. In a few weeks' time the common drainers got sufficient experience and knowledge to be able to lay the pipes in the way that they were instructed by Mr. Parkes's skilful men. Many farmers were very much averse to trying anything new until they can see its practice. No argument would convince the majority of them half so well as practice. With reference to the tools used by Mr. Parkes, there was no one person who had invented the whole of these tools. They were indebted to a number of individuals, who each contributed their quotum. The engineer had done his part, the tile manufacturer his part, and the workman the most important parts: with respect to the stick by which the pipe was laid down, they were indebted to the invention of a workman. There was nothing, he was sure, did more good in introducing draining in the country, than teaching the inhabitants to do it themselves (Applause). It was necessary in the first instance to instruct a few people, who would teach others in the adjacent districts. He (Mr. Marshall) recommended deep draining in preference to shallow. In a drain that he had been lately making, when it was first cut, a thermometer was put into it, and the water coming from it was from 54 to 55 degrees, but which in a day rose to about 58 degrees. What did this mean? It meant that the temperature of water was about 4 degrees, and the earth 54 degrees.

Mr. Smith, of Deanston, next rose and said:—Notwithstanding the ability with which Mr. Parkes has brought the subject before you, I beg to differ with him very materially upon several practical points. It appears to me that Mr. Parkes has departed altogether from the system of draining which I have long advocated;—that is, the removal from the soil below, of the water which falls upon the surface. Mr. Parkes appears to have adopted the Elkington system, which is one which I could never recommend for thorough draining. I have made these observations to show that I do not coincide with Mr. Parkes, but I shall wait until a future time, and then calmly take up the whole subject. I have had upwards of 30 years' experience in the system of draining which I have recommended, and therefore feel confidence in its merits. Under similar experience of the inefficiency of that recommended by Mr. Parkes, we all know that the agriculturist labours under circumstances of great difficulties in working experiments. The manufacturer, in making his improvements, is enabled to do so because his experiments require little time and can be repeated often in a year; but the agriculturist cannot do so, because he cannot command the necessary elements (Hear, hear). Every agriculturist knows that there are cycles of wet years, which may continue five, six, seven, or ten years, and that there are others which consist of dry years. What I say, therefore, is that no man ought to pronounce upon such an important matter as this with an experience extending over only three or four years (Applause). I hope it will not be believed that I am not open to conviction, when I am satisfied that what I have recommended is wrong and what another man recommends is better. But we are seeking after the truth, and it is our duty to guard against error, and not suffer ourselves in so important a matter to be misled (Applause). I shall ask you to go no further back than for the last few years that have gone by, in order to ascertain the value of the experiments in deep draining which have been put before us. The year 1844 was a dry year. Every person who lives in a clay district knows that during the dry periods the clay was more cracked and open than it had been for some years previously, and any person with the least observation, who resides in such a district as I have referred to, must know that after a year of this kind the water would readily run through the openings, not only for one year but several. Now suppose the water had been carried off in 1844, and that the draining had taken place at the end of the year, it is obvious the land would be quite prepared, and consequently the drains would have more effect than if put in after a wet season (Applause). The last year, upon the whole, was a wet one; but this one has been remarkably dry; and consequently, I say, it would be most unwise to pronounce an opinion upon the experience of deep draining in two or three such years. I may state that when we commenced draining in Stirlingshire, Perthshire, we cut our drains four feet deep, and 36 feet distant, and we thought we had done a great deal. The land appeared dry for some time, but a few wet years came on, and there was not a single field where insufficiency of the drains was not apparent. We then cut drains between every other of the former drains, thus making the drains 18 feet apart. The result was most satisfactory, and up to the present time the drains have been found to keep the land perfectly dry (Applause). This land, in consequence of being properly drained and worked, although consisting of stiff clay, is now so tender that Swedish turnips are grown upon it as fine as any produced on the first turnip soil in the neighbourhood (Applause). I should not like any to go away with the impression that they had been led astray in thorough draining. I did not make these observations with any feeling of acrimony: I have known Mr. Parkes for many years, and I entertain for him feelings of respect, such as I do for any one who seeks to improve the condition of his country. But let him, before stating as established facts any supposed discovery like those he has adverted to to-night, be perfectly satisfied of their accuracy from some length of experience (Applause).

Mr. **Shelley** said, he was sure all were extremely obliged to Mr. Smith for the observations he had made. He (Mr. Shelley) was extremely delighted to have heard what Mr. Smith had said, because when he first began to drain he had followed his directions, and drained in a shallow way, comparatively speaking. Since he had read Mr. Parkes's papers on the subject, he had drained not less than four feet deep. The observations of Mr. Parkes with reference to a deep drain running so much sooner than a shallow one, happened to be verified by what had taken place on his (Mr. Shelley's) own farm. He had two adjoining fields drained—one less than three feet deep, the other four feet; and the deep drain had operated more beneficially of the two. He wished Mr. Smith to explain that fact.

Mr. **Smith**.—Before I can venture to reply to this statement, I must know exactly the condition of the two fields.

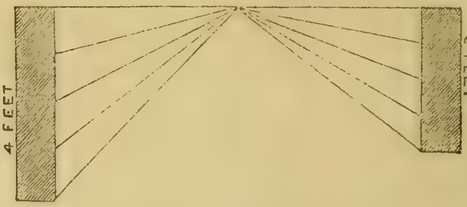
Mr. **Shelley**.—They were both good, honest, Weald of Sussex clay.

Mr. **Smith**.—Was the field which has been described as more benefited drained before at all?

Mr. **Shelley**.—Not at all: both were drained at the same time.

Mr. **Smith**.—I have no reason to doubt the accuracy of your observations, but I don't see on what philosophical principle it can be accounted for, unless there was some difference in the condition of the soil; because it is quite clear that nothing can lead the water to go quicker down.

Mr. **Geo. Darling**, of Hetton House, rose in the body of the meeting, and said he could readily explain the circumstance.—Being invited on to the platform, Mr. D. contented himself with drawing the following diagram, and immediately returned to his place, amidst loud cheers and some laughter.



Mr. **Smith**.—It would have been better if the gentleman had given us some verbal explanation of his meaning. (Hear.)

Mr. H. S. **Thompson** said, the thing explained itself. If the soil was in a condition to allow its being increased by the rain, and the water descended in a vertical direction, it would descend to a depth of three feet or more as soon as it would descend one foot; but when it comes to the bottom, to which it can descend vertically, it has then to send its way sideways, then it was that the water made slow progress. If the direction was solely vertical the water would, from the superambient pressure being greater, send its way sooner to a depth of three feet than of one foot.

Mr. **Smith** said, he was sorry to proceed further in the matter, but the point was a most important one. What the last gentleman had said was quite true, so long as the pressure was continued; but when the percolation commenced, the pressure was removed.

Mr. **Thompson** said, until the soil had become saturated, the pressure, vertical or lateral, did not begin. The rain falling from the surface must find its way through the soil. The soil must be in that state of openness as will allow the water to drop through it, and the gravitation will be the same in both instances. Therefore, there must be some difference in the condition of the different soils to allow the water to fall through a larger distance in a shorter space of time. (Two voices, " Not at all.") If the gentleman says, " Not at all"—(Several voices, " It does not always filter through the soil vertically, but sometimes laterally.") (Loud cheers.)

Lord **Portman**.—I am afraid I must interfere. I think we are not come here to teach my friend the proper way to drain his farm. (Laughter and cheers.)

Mr. **Shelley.**—I am sorry that I have to say another word, but I wish merely to explain that my only object was to show that what Mr. Parkes has said is true as regards my farm. (Cheers.)

Mr. **Wm. Bullock Webster**, of Hounsdon, Southampton, begged to occupy the time of the meeting but for a moment or two. He felt deeply interested in the question at issue, and to show that he was so, he was quite willing to provide 500 acres of land on which to have the two systems fairly tested, and he should then go in the principle which succeeded. (Applause.) The only condition which he laid down was, that he would pay the expense of laying the pipes, but that if Mr. Parkes desired, either he or the Royal Agricultural Society, or any one who would be willing to do so, should pay the expense of another trial. (Laughter and applause.) He (Mr. Webster) was not bigotted to any system; he had drained land at the depth of ten feet, six feet, and eighteen inches. In the last named instance he had been unable to go lower than eighteen inches, but in that case he found the land doubled in value, so that proved that it was not the water running underneath which ruined the land. (Applause.) With regard to the expense of the two systems, he produced an account of the drainage of some land belonging to the Duke of Cleveland, to show that it cost 5*l*. 19s. per acre, (with Mr. Parkes' expenses,) and therefore this could never be said to be a cheap system of draining. There were various other points to which he should like to allude, but time would not permit.

Mr. **Hillyard** begged to ask the chairman whether there would be any objection to resuming this very interesting discussion after the awards had been read?

The noble **Chairman** rose amid much applause and said, whatever the limit might be to their anxiety for knowledge, the limit of physical strength must be attended to. (Hear, hear.) He thought it would be unwise to abrogate the rules of the society, even to increase the time allotted for this interesting discussion. Placed as he was, he must say he thought himself bound to resist the feeling which seemed to be entertained for the prolongation of the discussion. He felt the more firmly convinced of the propriety of adopting this course, after the very just sentiments expressed by Mr. Smith; nothing could be more important than that they should not come to any hasty or rash conclusion. (Applause.) Mr. Smith required time, and they must all be convinced of the desirableness of that gentleman—possessed of so much experience as he was—having an opportunity to give a prepared and well considered opinion on the subject. With reference to the cost of deep draining, he held in his hand a paper which had been sent to the society by a farmer in Herefordshire, stating the result of deep draining in his locality. It had been stated that the cost would be about 9*l*. per acre, but with Scragg's machine it might be effected at a cost of 3*l*. 10s. per acre. His lordship concluded by recommending a careful consideration of the points elicited by the discussion, with a view to practical improvement, reminding them of the words of Solomon, adopted as the motto to the work which had been noticed by Mr. Parkes. "All, therefore, that thy hand findeth to do, do it with all thy might, for there is neither wisdom nor knowledge in the grave, whither thou goest."

The **Chairman** then proceeded to read the award of the judges:—

AWARD OF PREMIUMS.

SHORTHORNS.

Judges.—Mr. William Smith, of West Rasen, near Spital; Mr. Robert Cattley, of Brandsby, near York; Mr. Sober Watkin, of Plumpton, near Penrith.

The first prize of 40 sovereigns, for the best bull, calved previously to the 1st of January, 1844, was adjudged to Mr. Hopper, of Newham Grange, Stockton-on-Tees. The second prize of 15 sovereigns, to Mr. Raine, of Morton, Tinmouth, Darlington. 25 competitors.

The prize of 20 sovereigns, for the best bull, calved since the 1st of January, 1844, to Mr. Thomas Wetherell, of Durham. 25 competitors.

The prize of 15 sovereigns, for the best cow in milk or in calf, to Mr. Richard Booth, of Warlaby, near Northallerton. 18 competitors.

The prize of 15 sovereigns, for the best in-calf heifer, not exceeding three years old, to Mr. John Booth, of Killerby, near Catterick. 14 competitors.

The prize of 10 sovereigns, for the best yearling heifer, to Mr. J. Banks Stanhope, of Revesby Abbey, near Boston. 17 competitors.

The prize of 10 sovereigns, for the best bull calf, not exceeding one year old, to Mr. James Banks Stanhope, of Revesby Abbey, near Boston. 4 competitors.

The judges highly commend—No. 7, Mr. Thomas Crofton's bull; No. 12, Mr. Harvey's bull; No. 60, the Duke of Buccleugh's cow; No. 69, Mr. Fawkes' cow; No. 71, Mr. Forest's cow; No. 80, Mr. R. Booth's heifer; No. 85, Lord Feversham's heifer; No. 92, Mr. Wetherell's heifer; No. 45, Mr. Forrest's bull; and commend No. 107, Mr. Trotter's heifer.

HEREFORDS.

Judges.—Mr. Henry Chamberlain, of Desford, near Leicester; Mr. Wm. Tinder, of Wantage; Rev. J. R. Smythies, of Grey Friar's, Colchester.

The first prize of 40 sovereigns, for the best bull, calved previously to the 1st of January, 1844, to Mr. Edward Gough, of Gravell-hill, near Shrewsbury. The second prize of 15 sovereigns, to Mr. Edward Williams, of Lowes Court, near Hay. 3 competitors.

The prize of 20 sovereigns, for the best bull, calved since the 1st of January, 1844, to Mr. Carpenter, of Eardisland, Leominster. 2 competitors.

The prize of 15 sovereigns, for the best cow in milk or in calf, to Mr. Charles Walker, of Sutton, Tenbury. 2 competitors.

No competition for the prize of 15 sovereigns, for the best in-calf heifer, not exceeding three years old.

The prize of 10 sovereigns, for the best yearling heifer, to Mr. Carpenter, of Eardisland, near Leominster. 7 competitors.

The prize of 10 sovereigns, for the best bull calf, not exceeding one year old, to Mr. Carpenter, of Eardisland, near Leominster. 3 competitors.

DEVONS.

Judges.—Mr. William Gillett, of Southleigh, near Witney; Mr. Edw. L. Franklin, of Ascott, near Wallingford; Mr. William Torr, of Riby, near Caistor.

The first prize of 40 sovereigns, for the best bull, calved previously to the 1st of January, 1844, to Mr. George Turner, of Barton, near Exeter. The second prize of 15 sovereigns, to Mr. Fouracre, of Durston, near Taunton. 3 competitors.

The prize of 20 sovereigns, for the best bull, calved since the 1st of January, 1844, and more than one year old, to Mr. Thomas Bond, of Bishop's Lydeard, Taunton. 2 competitors.

The prize of 15 sovereigns, for the best cow in milk or in calf, to Mr. Fouracre, of Durston, near Taunton. 4 competitors.

The prize of 15 sovereigns, for the best in-calf heifer, not exceeding 3 years old, to Mr. George Turner, of Barton, near Exeter. 2 competitors.

The prize of 10 sovereigns, for the best yearling heifer, to Mr. Fouracre, of Durston, near Taunton. 2 competitors.

The prize of 10 sovereigns for the best bull calf, not exceeding one year old, to Mr. Thomas Bond, of Bishops Lydeard, near Taunton. 2 competitors.

CATTLE OF ANY BREED.

Not being Short Horns, Herefords, or Devons.

Judges.—Mr. Joseph Druce, of Ensham, Oxon; Mr. William Ladds, of Ellington, near Huntingdon; and Mr. John Elliot, of Chapel Brampton, near Northampton.

The first prize of 25 sovereigns for the best bull, calved previously to the 1st of January, 1844, to the Hon. M. W. B. Nugent, of Higham Grange, Hinckley. The second prize of 10 sovereigns, to Mr. John Marshall, of Long Park, Scaleby. 3 competitors.

The prize of 15 sovereigns, for the best bull, calved since the 1st of January, 1844, and more than one year old, to the Hon. M. W. B. Nugent, Higham Grange, Hinckley. 5 competitors.

The prize of 15 sovereigns, for the best cow in milk or in calf, to the Hon. M. W. B. Nugent, of Higham Grange, Hinckley. 9 competitors.

The prize of 10 sovereigns, for the best in-calf heifer, not exceeding three years old, to the Hon. M. W. B. Nugent, of Higham Grange, Hinckley. 5 competitors.

The prize of 10 sovereigns, for the best yearling heifer, to the Hon. M. W. B. Nugent, of Higham Grange, Hinckley. 4 competitors.

HORSES.

Judges.—Mr. William Dobson, of West Auckland, Durham; Mr. Thomas Crisp, of Gedgrave, near Woodbridge; Mr. William Day, of Ensham, Oxon.

The first prize of 40 sovereigns, for the best stallion for agricultural purposes, of any age, to Mr. N. Barthropp, of Cretingham Rookery, Woodbridge. The second prize of 15 sovereigns, to Mr. Thomas Richardson, of Solmain, Brampton. 21 competitors.

The prize of 15 sovereigns, for the best three-years-old stallion for agricultural purposes, to Mr. Frederick Thomas Bryan, Knossington, Leicestershire. 8 competitors.

The prize of 15 sovereigns, for the best two-years-old stallion for agricultural purposes, to Mr. Edward Mills, Molesdon, Morpeth. 6 competitors.

The prize of 20 sovereigns, for the best mare and foal, to the Right Hon. Lord St. John, of Melchbourne, Higham Ferrers. The second prize of 10 sovereigns, in class 4, is withheld. 6 competitors.

The prize of 10 sovereigns, for the best two-years-old filly, to Mr. Thomas Forster, of Scrainwood, Rothbury. 4 competitors.

The prize of 30 sovereigns, for the best thorough bred stallion, to Mr. George Holmes, of Thirsk. 10 competitors.

The judges commended No. 211, Lord St. John's stallion.

The judges highly commended No. 241, Mr. Ferguson's stallion; and No. 232, Mr. Foxton's stallion.

LEICESTERS.

Judges.—Mr. Thos. P. Stone, of Barrow, near Loughborough; Mr. John M. Ashdown, of Uppington, near Wellington, Salop; Mr. John Wright, of Romeley, near Chesterfield.

The first prize of 40 sovereigns, for the best shearling ram, to Mr. George Turner, of Barton, near Exeter. The second prize of 15 sovereigns, to Mr. Robert Smith, of Burley-on-the-hill, Oakham. 37 competitors.

The first prize of 30 sovereigns, for the best ram of any other age, to Mr. Robert Burgess, of Cotgrave Place, near Nottingham. The second prize of 15 sovereigns, to Mr. Pawlett, of Beeston, near Biggleswade, Beds. 24 competitors.

The first prize of 10 sovereigns, for the best pen of five shearling ewes, to Mr. George Angas, of Neswick, Driffield. Not sufficient merit for the second prize of 5 sovereigns, in class 3. 8 competitors.

The judges highly commended No. 312, Mr. R. Burgess's ram; No. 314, Mr. R. Burgess's ram; No. 315, Mr. R. Burgess's ram. They also commended No. 331, Mr. Pawlett's ram; No. 332, Mr. Pawlett's ram.

SOUTHDOWNS.

Judges.—Mr. Henry Overman, of Weasenham, near Rougham; Mr. Edward Pope, of Mapperton, near Beaminster; Mr. Edward Trumper, of Nuneham Park, near Oxford.

The first prize of 40 sovereigns, for the best shearling ram, to Mr. Jonas Webb, of Babraham, near Cambridge. The second prize of 15 sovereigns, to Mr. Webb, of Babraham, near Cambridge. 28 competitors.

The first prize of 30 sovereigns, for the best ram, to Mr. Jonas Webb, of Babraham, near Cambridge. The second prize of 15 sovereigns, to His Grace the Duke of Richmond, of Goodwood, near Chichester. 7 competitors.

The first prize of 10 sovereign, for the best pen of 5 shearling ewes, to His Grace the Duke of Richmond, of Goodwood, near Chichester. The second prize of 5 sovereigns, to Mr. Barnard, M. P., of Gosfield Hall, Halstead, Essex. 6 competitors.

The judges highly commended No. 388, Mr. Jonas Webb's ram. They also commended No. 337, Mr. Goodlake's ram; No. 389, Mr. Jonas Webb's ram; No. 400, the Duke of Richmond's ram; No. 403, Mr. Barclay, M. P.'s ewes.

LONG-WOOLLED SHEEP.

Not qualified to compete as Leicesters.

Judges.—Mr. Henry Bateman, of Asthally, near Witney, Oxon; Mr. Charles Stokes, of Kingston, near Derby; Mr. Charles Clarke, of Aisthorpe, near Lincoln.

The first prize of 40 sovereigns, for the best shearling ram, to Mr. Charles Large, of Broadwell, near Lechlade. The second prize of 15 sovereigns, to Mr. Edward Handy, of Sevenhampton, near Andoverford. 11 competitors.

The first prize of 30 sovereigns, for the best ram, to Mr. Handy, of Sevenhampton, Andoverford. The second prize of 15 sovereigns, to Mr. Charles Large, of Broadwell, near Lechlade. 5 competitors.

The first prize of 10 sovereigns, for the best pen of 5 shearling ewes, to Mr. Edward Smith, of Charlbury, near Enstone, Oxfordshire. No competition for the second prize of 5 sovereigns.

The judges highly commended No. 425, Mr. Edward Smith's ram. They also commended No. 424, Mr. Large's ram.

SHEEP BEST ADAPTED TO A MOUNTAIN DISTRICT.

Not qualified to compete as Southdowns.

Judges.—Mr. Hugh Watson, of Keillor, near Coupar, Angus, N.B.; Mr. Joseph Currah, of Unthank, Stanhope, Durham; Mr. Richard Henderson, of Langlerford, Wooler.

The first prize of 20 sovereigns, for the best ram of any age, to Mr. Bolam, of Fawdon, Whittingham. The second prize of 10 sovereigns, to Mr. William Forster, of Burradon, Rothbury. 26 competitors.

The prize of 10 sovereigns, for the best pen of 5 shearling ewes, to Mr. Elliott, of Hindtrope, Jedburgh. 6 competitors.

The prize of 10 sovereigns, for the best pen of ewes, of any age, to Mr. Elliott, of Hindtrope, Jedburgh. 4 competitors.

Prizes offered by the Local Committee.

BLACK-FACED SHEEP.

The first prize of 10 sovereigns, for the best shearling ram, to Mr. Charles Summers, of Park Head, Whitfield. The second prize of five sovereigns, for the second best shearling ram, to Mr. H. Philipson, of Allenheads, Allendale. 7 competitors.

The first prize of 10 sovereigns, for the best ram of any age, to Mr. Henry Philipson, of Allenheads, Allendale. For the second prize of 5 sovereigns, for the second best ram of any age, to Mr. Charles Summers, of Parkhead, Whitfield. 10 competitors.

The prize of 5 sovereigns for the best pen of gimmers, to Mr. William Dodd, of Paddaburn, Bellingham. 3 competitors.

Prizes offered by the North Tyne and Redesdale Agricultural Society.

The first prize of 10 sovereigns, for the best pen of pure Cheviot shearling rams, to Mr. Robson, of East Keildor, near Bellingham. The second prize of 5 sovereigns, for the best pen of pure Cheviot shearling rams, to Mr. Henry Thompson, of Ramshope, near Newcastle. 5 competitors.

PIGS.

Judges.—Mr. Samuel Wiley, of Brandsby, near York; Mr. John Clayden, of Littlebury, near Saffron Walden; Mr. Jesse Kemp, of Thurlby Grange, near Alford.

The first prize of 15 sovereigns, for the best boar of a large breed, to Dr. Richard Hobson, Park House, Leeds. The second prize of 5 sovereigns, to Mr. Mauleverer, of Arncliff Hall, Cleveland, Thirsk. 17 competitors.

The first prize of 15 sovereigns, for the best boar of a small breed, to Mr. A. Wilson, of the Abbey, Wigton. The second prize of 5 sovereigns, to Mr. Robert James, of Chalkside, Wigton. 22 competitors.

The prize of 10 sovereigns, for the best breeding sow of a large breed, to Mr. Charles Jackson, of Fossgate, York. 15 competitors.

The prize of 10 sovereigns, for the best breeding sow of a small breed, to Dr. Richard Hobson, of Park House, Leeds. 32 competiters.

The prize of 10 sovereigns, for the best pen of 3 breeding sow-pigs of the same litter, above four and under ten months old, to Mr. Wm. Fisher Hobbs, of Markshall, Kelvedon, Essex. 7 competitors.

The judges very highly commended No. 494, Mr. Graham's boar; No. 557, Mr. Hobson's sow; highly commended No. 517, Mr. Hobson's boar; No. 518, Mr. Hopper's boar; No. 527, Rev. C. Thompson's boar; No. 541, the Duke of Northumberland's sow; No. 544, Mr. Trotter's sow; No. 558, Mr. Hobbs's sow; No. 568, Mr. Russell's sow; No. 574, Mr. Wilson's sow; No. 582, Earl of Radnor's sow; No. 515, Mr. Hobbs's boar; and commended No. 506, Mr. Ridley's boar; No. 510, Mr. Ellison's boar; No. 516, Mr. Hobbs's boar; No. 542, Mr. Nutt's sow; No. 553, the Rev. J. Higginson's sow; No. 560, Mr. Hunt's sow; No. 564, Mr. March's sow; No. 565, Mr. March's sow; No. 569, Mr. Timothy Smith's sow; No. 571, the Rev. C. Thompson's sow; No. 572, the Rev. C. Thompson's sow; No. 577, Mr. Ellison's sow; No. 581, the Duke of Northumberland's sow.

WOOL.

Judges.—Mr. Hillyard, of Thorpelands, near Northampton; Mr. Matthew Pedley, of Smith Street, Warwick; Mr. Thomas Rowland Legg, of Bermondsey Street, London.

Long Wool.—The prize of 10 sovereigns, for the best samples of 10 fleeces of long wool, to Mr. Thomas Maddison, of Wandon, near Belford. 7 competitors.

Short Wool.—The prize of 10 sovereigns, for the best sample of ten fleeces of short wool, to Mr. Thomas Elliott, of Hindthorpe, Jedburgh. 9 competitors.

Mixed Breed.—The prize of 10 sovereigns, for the best samples of ten fleeces of wool, of mixed breed, to Mr. Ellison, of Sizergh Castle, Kendal. 8 competitors.

EXTRA STOCK.

BEAST.

Four pounds was awarded to Mr. Booth, of Killerby, near Catterick, for a short horn cow.

Two pounds was awarded to Mr. Booth, for a short horn cow.

One pound was awarded to Mr. Crofton, of Holywell, Durham, for a short horn cow.

One pound was awarded to Mr. Thos. Wetherell, of Durham, for a short horned heifer calf.

Two pounds was awarded to Mr. Thomas Wilson, of Shotley Hall, Newcastle, for a short horned heifer.

HORSES.

Five pounds was awarded to Mr. Geo. Trotter, of Bishop's Middleham, for a colt.

SHEEP.

Three pounds was awarded to Mr. John Clarke, of Long Sutton, Wisbeach, for an improved long wooled ewe.

Five pounds was awarded to Mr. Thos. Maddison, Wandon, Belford, for five Leicester ewes.

IMPLEMENTS.—PRIZES AWARDED.

10*l*. for the best heavy land plough, Mr. John Howard, of Bedford; 10*l*. for the best light land plough, Mr. John Howard, of Bedford; 15*l*. for the best drill plough for general purposes, Mr. Hornsby, of Grantham; 10*l*. for turnip drill on the flat, Mr. Hunter, of Ulceby, near Barrow-upon-Humber, Lincoln.

10*l*. for the best turnip drill on the ridge, Mr. Teasdale, of Burneston, near Bedale, Yorkshire.

10*l*. for the best scarifier, Mr. Crosskill, of Beverley.

10*l*. for the best chaff cutter, Mr. Cornes, of Barbridge, near Nantwich, Chester.

20*l*. for the best machine for making drain pipes and tiles, Mr. Scragg, of Calverley, near Turporley, Chester.

5*l*. for the best harrow, Mr. Coleman, of Colchester.

10*l*. for the best drill presser, Mr. Hornsby, of Spittlegate, Grantham, Lincolnshire.

5*l*. for the best churn, Mr. Robinson, of Lisburn, County Antrim.

10*l*. for weighing machine for farm and live cattle, Messrs. James and Co., Fish-street-hill, London.

Skim or Paring Plough, not awarded.

10*l*. for the best subsoil pulverizer, Mr. Read, of 35, Regent's Circus, Piccadilly, London.

5*l*. for horse seed dibbler, not awarded.

5*l*. for hand seed dibbler, Mr. Crawford, Birmingham.

5*l*. for linseed crusher, Mr. Crosskill, Beverley.

5*l.* for one horse cart, Mr. Crosskill.

25*l.* for four horse power thrashing machine, Mr. R. Garrett, of Leiston Works, Saxmundham, Suffolk.

5*l.* for steaming apparatus for roots, Mr. Robinson, Lisburn, Antrim.

Draining tools and instruments.—Not awarded.

Steam power applicable to thrashing and agricultural purposes, and horse power ditto.—Not awarded.

MISCELLANEOUS ARTICLES.

2*l.* for the best hayband maker, Mr. Edward Pierce, of Llanase, near Holywell.

3*l.* for the best corn crusher, Mr. Z. Parkes, Birmingham.

3*l.* for the best winnowing machine, Mr. Hornsby, Spittlegate, Grantham.

5*l.* for Rowan's patent axle, Mr. R. Robinson, Lisburn, County Antrim.

3*l.* for the best hay rake, Mr. Grant, Stamford.

5*l.* for the best hay making machine, Messrs. H. Smith, Stamford.

5*l.* for the best Norwegian Harrow, Mr. Stratton, Bristol.

5*l.* for the best tile machine, Mr. Garrett, Saxmundham.

Silver medal for the best grubber, Messrs. Smith, Stamford.

Silver medal for the best spike roller, Messrs. Barrett and Ashton, Hull.

Silver medal for the best wheels and anxle, to Mr. Crosskill, Beverley.

Silver medal for the best Kent drill, Mr. Garrett, Saxmundham.

Silver medal for the best root washer, Mr. Richmond, Salford.

Silver medal for the best whipple trees, Mr. Harding, Old Springs, near Market Drayton.

THE ANNUAL DINNER OF THE MEMBERS OF THE ROYAL AGRICULTURAL SOCIETY OF ENGLAND, ON THURSDAY, JULY 16.

STEWARDS OF THE TABLES.

High Table.

LORD PORTMAN, PRESIDENT.

Vice-President's Table.

EARL OF EGMONT, PRESIDENT-ELECT.

Tables on the President's right.	*Tables on the President's left.*
Sir J. Johnstone, Bart, M.P.	William Shaw
Lord Hatherton	Viscount Torrington
W. R. Browne	Richard Milward
Colonel Austen, M.P.	David Barclay, M.P.
Henry Stephen Thompson	John Hudson
Duke of Richmond	Thomas Raymond Barker
Samuel Bennett	Samuel Jonas
Francis Pym	Sir M. W. Ridley, Bart.
Henry Blanshard	C. Hillyard
Colonel Challoner	W. R. C. Stansfield, M.P.
William Fisher Hobbs	J. Walbanke Childers
John Kinder	Stephen Grantham
James Allen Ransome	Charles Stokes
George Turner	Viscount Hill
Henry Wilson	Sir C. Lemon, Bart., M.P.
Sir R. Price, Bart., M.P.	Edward Buller, M.P.
Professor Sewell	John Grey
John Villiers Shelley	William Miles, M.P.

At five o'clock Lord Portman, accompanied by his Royal Highness the Duke of Cambridge, took the chair. He was supported right and left by the Duke of Cleveland, the Mayor of Newcastle, the High Sheriff of Northumberland, the Earl of Chichester, the Earl of Buchan, Lord Polwarth, Lord Morpeth, Hon. H. F. Liddell, M.P., the Rev. Dr. Buckland, Dean of Westminster, Sir Roderick Murchison, K.S.P., M. Bell, Esq., M.P., F. Ogle, Esq., M.P., Colonel Irton, M.P., Colonel Archbold, M.P., G. Hudson, Esq., M.P., &c.

The vice chair was occupied by the President-Elect, the Earl of Egmont.

His Grace the Duke of Cambridge and the other distinguished guests were welcomed with applause on their entrance.

Shortly after the tables were cleared,

Lord PORTMAN said—Before I propose to you the toast which every Englishman knows is the first he drinks, in public or in private, I must take advantage of the position I hold, of impressing upon all those who are members of this society, who have not hitherto attended our meetings in other parts of the country, that the rules which have been established, and the regulations which have been made, must be strictly and exactly attended to (cheers). The chief rule I wish to impress upon you is, that the paper I hold in my hand contains a list of the only toasts that can be permitted to be given, and the names of the only speakers who can be permitted to speak (applause). I must remind you, that I occupy this place by your special commission, and that which I had in April to do is done in the name and with the support of all who are now present (applause). If I were disposed to go a little more at length into this matter I might perhaps fatigue you, but I will use the words of Shakspeare, and tell you, "You have lent me your terror: you have dressed me with your love, and you have invested me with the different organs of your power" (cheers). I am about to propose to you the health of her Most Gracious Majesty the Queen of this country (loud cheers). It would be superfluous to say one word upon such a toast as that, were it not that one who has witnessed her Majesty's conduct during the whole of her reign now addresses you, and not only knows that the exemplary manner in which she discharges all her public duties has endeared her to all statesmen of all shades of opinion—(cheers)—but also that she has attached to her the heart of every Englishman, because she has shown her affection for that particular service which all Englishmen are proud of when they reflect upon the wooden walls of old England (cheers). Her Majesty has proved herself fit to be Queen of that ocean whose waves Britannia rules, nor less has she distinguished herself in domestic life (cheers). That it is which comes nearest to your hearts; for no man is present now, I am quite sure, who does not know the value of either a good daughter, a good wife, or a good mother; for in all and each of these capacities her Majesty stands pre-eminently distinguished (cheers). I will not occupy more of your time upon such a topic, but I ask you to drink, with as many cheers as you think fit, "The health of her Majesty."

The toast was received and drunk with the most hearty cheering.

The **Chairman** again rose and said—In rising to propose to you the next toast, it is scarcely necessary for me to enlarge upon the peculiar merits of each individual whose name is confined within that toast as it stands before you. But it would be quite wrong, because it would be appearing to slight the possessors of the greatest and most valuable of virtues, if I did not remind you that her Majesty the Queen Dowager is distinguished for her charity (cheers)—that charity which covereth a multitude of defects; though defects in her I believe there are none (cheers). In alluding to his Royal Highness Prince Albert, I need only remind you he is endeavouring to become a practical farmer (cheers)—by giving you practical proof whether deep or shallow draining is likely to be most effective (cheers). Of his Royal Highness Albert Prince of Wales, I only trust that he may be educated, as he is sure to be by his parents, well, learn his lesson well, and will be a good Prince of Wales for many, many years to come (cheers). But when I proceed with the toast, I should, if his Royal Highness were not amongst us (loud cheers), be disposed to dilate upon the merits which, during a long life, he has proved himself to possess. But it would be wrong in me, at such a moment, to enlarge upon it. I will only state this, that it will be the greatest gratification to every member of this vast community to have had the honour of his presence here. He has proved himself all his life the devoted friend of the farmer, and I am sure you will give him your heartfelt thanks for it.

The toast was drunk with loud cheers.

The Duke of **Cambridge** said: Gentlemen, in the first place I beg to return you, in the name of the members of the Royal Family and myself, my most grateful thanks for the very flattering manner in which, upon this occasion, you have drunk the toast. I can assure you, as far as concerns myself personally, that there is no truer friend to the farmers assembled here and the farmers of this country than I am (cheers). And though I cannot say I am myself a great farmer, or have a great farm in my possession, yet I believe that no man is more desirous, as far as I can, to support the protection of the agriculturists of this country (Hear, hear). Several of those whom I now address perhaps I addressed four years ago at Bristol, and with the greatest satisfaction do I now meet them here. Unfortunately I was prevented by different circumstances from being present at the last three meetings, though I was present for a short time at the last meeting, at Southampton; but the warmth of my feelings for the cause was always at them, whether I was present at those meetings or not. And I can assure you it is with the greatest satisfaction to me that I have been able to attend here this day. It is also impossible for me, being in this town, not to express the gratification that I have felt in my visit of the last few days at witnessing the manufactures of the town (applause), and the great pleasure it gives me to see a gentleman who is now present giving a proof of the greatness of this country, by having raised himself by his energy and talent—by his own merits—to his present high position (cheers). [His Royal Highness was understood to allude to Mr. Stephenson.] My lord, allow me to express the gratification I have felt in meeting you here, and to state, that every time I have the pleasure to attend such societies, my regard and esteem and well-wishes will increase; for I am convinced that the good this society has done in this country (and this is, I believe, the ninth year of its existence) is incalculable, and I only hope that this society may constantly thrive. I beg, therefore, to conclude with the toast of "Success to the Royal Agricultural Society of England" (cheers).

The Earl of **Chichester** then rose and was received with great cheering. His lordship said—My Lord Portman and gentlemen, you have desired me to propose to you a toast, which I am sure will be drunk by this large meeting with great satisfaction. That toast is, "Agriculture, Manufactures, and Commerce" (cheers). Before I recommend this toast to you, I feel that it is only fair, both to myself and to the council of this society, that I should tell you that, until I entered the room, I did not expect to be called on to address this large meeting. But I came here, as I always do, prepared to obey orders (cheers); and, therefore, though I feel but little qualified to do justice to the very important principles and interests involved in this toast, I must endeavour to recommend it to you in the best way that I can (cheers). Gentlemen, my noble friend will excuse me for mentioning that when I received his orders, I ventured to make some little complaint on the very short notice he had given me; and my noble friend's only excuse was, that the council had selected me, because they believed me to be a "steady" man (cheers and laughter). I suppose what my noble friend meant was this. He knows, that having been one of the earliest members, and, I may say, promoters of this great institution, I had been brought up under very strict discipline, and that I well know our rules, not only in the general way in which my friend stated them to this meeting, but in all those particular and very rigorous details in which we always obey them at our annual meetings. I trust, therefore, in the few observations I shall venture to make, I shall prove that I have profited by this good discipline, and say nothing at this meeting that any one present could wish not to remember (cheers). I conceive, gentlemen, that the great truth involved in this fact, and which it is the desire of the council of this society to impress upon you, and to keep in mind themselves, is the one great interest which affects all the people of this country, and the reciprocal interest which exists between those great portions of the community, which we recognize by the terms, "Agriculture, Manufactures, and Commerce" (cheers). His Royal Highness has, I think, already enabled this meeting to understand the object for which this toast is proposed on this occasion. His Royal Highness has proposed to you to drink prosperity to this society, and this meeting wishes this nation to understand that in promoting the efficiency and success of this society you are promoting the interests of the community at large (cheers). Gentlemen, when I first joined this society, and indeed ever since till about eight months ago, I had great interest in the prosperity of agriculture, and what is not quite identical, I took great interest in the prosperity of manufactures, but until the period to which I allude I was not myself a practical farmer. Having now become so, I would venture to state to this meeting the source from which I draw encouragement, under God's good providence, and those other and higher considerations which ought to encourage us in every difficult task; the source from whence I have derived encouragement to undertake what all of us feel, and ought to feel, to be a work of considerable difficulty, and one requiring from those who intend to proceed in it a considerable share of diligence and patient attention. Gentlemen, we are all aware that the farmer, in the course of his operations in husbandry, is in the habit of watching those signs which Providence has given us, and by which we judge to a certain degree what weather and seasons we may expect; and though we are not able to foretell for a long time together what weather we shall have, yet, if we are sedulous in watching those signs, we shall generally make pretty sure guesses what they will be when we look around us and observe the state of the horizon. Gentlemen, these are the principles and rules which in all times have been adopted by the farmers of a great country like this; those of them at least, and I hope a very large portion of them, that are thoughtful and reflecting men. They look to another horizon, because it is all very well to be able to infer from the state of the natural horizon whether we shall fail or prosper in the labour of the day: but we have also to consider, particularly in large undertakings, what we may expect to be the state of the demand for our produce. Now, gentlemen, this is a topic which, without trespassing on the rules of the society laid down by my Noble Friend, I may say, must enter into the mind of every thoughtful and prudent man entering into any speculation whatever. And when I entered into those speculations, the manner in which I directed my observations, to ascertain whether improvements in agriculture and the increase in agricultural produce was likely to be an employment in which one might safely engage, was towards the state of the country in general. I tried to ascertain how far I might look upon the prosperity of those two great interests, which are included in the toast I now propose to you, and in considering this question my eyes were turned towards the North of England. You all know, gentlemen, many of you living in this district, how essentially the prosperity of our agriculturists must always depend upon the prosperity of those almost innumerable masses of our countrymen who reside and labour—and I trust happily, because industriously—in the populous districts in the northern part of our kingdom (applause). I say this, gentlemen, that any sensible and thoughtful farmer when he is inquiring for himself whether his speculations are likely to succeed or not, that he makes himself acquainted with, and considers the state of those great manufacturing populations which reside at a distance (cheers). And so we have found it to be the case, that just in proportion as the manufacturing part of the population of the country prospers and thrives, so do we find a ready market for our produce (cheers). And not only does this, but every other instance shows that the three interests comprised in the toast I am about to propose are identical—depending as they do so intimately upon each other (cheers). Gentlemen, that would be the argument which I should venture to address to you as a farmer (cheers). May I be allowed to say one word respecting the other two great classes that are comprised in the toast? and I am sure they will agree with me when I say that a great deal of their wealth and prosperity must ever depend—I will not say how much—upon the prosperity of those of their fellow-countrymen who are engaged in producing food; and therefore it has always been a source of great satisfaction to me, in travelling about the country with this society in its great anniversary meetings—I say it has been a great satisfaction to me to perceive the interest felt at our success, by those who have, perhaps, no immediate interest in the success of agriculture (applause). And I am sure that in a great town like this, in a neighbourhood so thickly populated as the one in which we are assembled, it must be an object of great concern to witness the efforts which we are feebly but heartily making to improve the science of agriculture, and thus to add to that supply of food which, if we exert ourselves—if the farmers of England bestir themselves—will enable them to scatter plenty and comfort through this great and increasing population (loud cheers). I am happy to think that the opinions I here express, cannot militate in any way against the peculiar opinions which gentlemen may hold with respect to other subjects to which we may not at this meeting allude; because I am confident that any man who considers those laws which a good and gracious Providence has appointed for our guidance, must be convinced that the different avocations of life—the different industrial employments of life—should one and all minister to the social temporal benefit and improvement of the community at large (loud cheers). I am quite sure that all who have thoroughly considered this subject must acknowledge that great truth, and that it is the duty of all to take every opportunity they may possess of enforcing this great, this blessed economy, which shews that each and every class of the community are interested in the common weal of the country (loud cheers). My Lord, I feel that I have said quite enough for a steady man—for one at all events who has been brought forward in that capacity. I therefore shall now conclude with impressing it upon the meeting to drink the sentiment contained in the toast. Now I propose—" Prosperity and success to Agriculture, Manufactures, and Commerce."

The toast was drunk amid loud cheers.

The Duke of **Cleveland**, upon rising to propose the next toast, was received with long-continued cheering. As soon as silence had been obtained, he said—My Lord and Gentlemen, the next toast which I find on the list is the " Mayor and Corporation of the town of Newcastle" (cheers). It has been deputed to the humble individual who has now the honour of addressing you, to offer this toast to your notice, and to ask for your approbation (loud cheers). And, gentlemen, whilst on the one hand I cannot but regret that this task has not been entrusted to some one more competent to do it justice than myself, yet on the other I feel both honoured and flattered on being selected as the instrument upon this occasion to carry the task into execution (cheers). I need scarcely remind you that, in an exhibition of such magnitude, whatever may be the desires, whatever the efforts of this society to give that accommodation so necessary, and those facilities so essential to your ingress and egress to the show yard of cattle and implements—it would, I say, be impossible for them to carry those arrangements satisfactorily into effect, if they had not received the co-operation and assistance of the local authorities (cheers). Gentlemen, for the manner in which your accommodation has been secured—for the manner in which the task has been executed by the local authorities—it is for you to form an opinion, and to pronounce your judgment (cheers). It is not for me to make any remarks or comments upon the subject; but I may be perhaps allowed to say that, whilst I believe that as regards the show of implements, there was both a greater number and a greater variety and novelty than ever was witnessed at any former meeting, so I believe the same remarks may be made applicable to the show of cattle, both as respects quality and number; and as every facility was afforded the public for witnessing this splendid exhibition, so I think credit ought to be given to the local authorities to whom it is so eminently due, for having aided in providing these arrangements. Having offered to you these few remarks as prefatory to the toast which I am about to conclude with proposing, I may be allowed to state, whilst I am on my legs, that for myself I have taken, for a great number of years, a deep interest not only in agricultural pursuits, but also in any thing that will tend to the encouragement and to the support of agriculture—partly from inclination, partly from amusement, and though last not least, from a thorough sense of duty, connected as I am with the landed interest (loud cheers). And, with these feelings, I may be allowed to state, that I have long thought that this society has done much good, and I think I may also add that, at least as far as I have been able to perceive, it has been very successful in its operations. Since it has commenced its operations there has been a great improvement in machinery. By machinery I mean the manufacture of agricultural implements, many of which have been newly invented, and which are now widely distributed, and have been for some time brought into general use; and at the same time new processes have been adopted in agriculture, from which great benefits have been derived. And I firmly believe that if it had not been for this society great numbers of these implements would have remained comparatively unknown, and many of them would never have been invented at all (cheers). There is also another advantage which I think is derived from this society, in its itinerant character. Every district in the country has thus the advantage of the presence of this society in regular rotation. All the county associations, which are now becoming so general, have the advantage of the British Agricultural Society, so that they may be able to follow its precepts and examples as far as they think them worthy of imitation. (Hear, hear). I hope, therefore, that notwithstanding what has lately taken place, this society will continue to flourish as much as it ever has done (loud cheers). Entertaining, as I am known to do, very strong opinions in this respect, I must yet say that I neither despair nor despond (great cheering). I sincerely hope that the community at large will see no reason whatever to discontinue their support to the society; for I myself am ready to confess that I see no reason why we should not benefit from it fully as much in time to come as we have benefited in times past (cheers). At the same time it is right to add, and I do so with great regret, that there are certain parties known to me, who on account of recent legislative measures are about to withdraw their subscriptions from the society. Much as I regret this circumstance, still, under all the circumstances, I am not surprised at it. Nevertheless, of this I am sure, that whatever may be the feelings of certain portions of the community on this subject, the nation at large will never be brought to pronounce that agriculture is not an essential branch of prosperity (cheers). But, forgetting all that is past—for I say, and I may certainly be allowed to say as much, that agriculture has received a heavy blow and a great discouragement (cheers)—yet I must still say, that is no reason why you should relax your endeavours, or why you should not endeavour to exert yourselves to the utmost. (Hear, hear). My advice to you is, wherever improvement has not yet taken place, to go on, as far as in you lies, to create that improvement. I know there is still much to be done in every district in England in the shape of improvement: as regards draining, as regards the application of manures, and as regards many other processes, much may be done for the improvement of the cultivation of the land, and of growing a greater quantity of produce than before (cheers). All these circumstances are matters of encouragement for you to go as far as you can go in the way of improvement, and not to relax in your exertions; for remember you are now cast upon your own resources, and upon your own resources alone (loud cheers). But whilst I acknowledge on the one hand that much improvement has taken place, and whilst I am ready to allow that there are many parts of the country in which further improvements may yet take place, yet I must take the liberty of denying the fallacy which is so often asserted, that you can improve to any extent and without limit; for although the manufacturers of this country, by their ingenuity and skill, and by means of machinery, can carry on their improvements without limit, yet there is a limit to agriculture—there is a point beyond which you cannot go (loud cheers). Having said this, perhaps I may be called upon, and I ought to say why this is my opinion—for I give it merely as my opinion; others may differ from me, but my reason for holding this opinion is simply this: You all know that manufactures may be carried on with a skill, an industry, and a power of machinery, which reduces the matter to a certainty — they have the whole under their control — they know that their improvements will never fail, unless their industry or their machinery fail them. Some might be also inclined to say that there is no limit to the propulsion of locomotive engines along a railway, because by the power of human skill and ingenuity you may accelerate their speed without limit; but in agriculture you are dependent upon the weather and the seasons, let ingenuity be what it will. I say you cannot guard against the weather. I address a number of persons who live, like myself, in the north of England. In the north of England we are not favoured with so fine a climate, and with such good weather to ripen the corn as our neighbours in the south and west of the island have the advantage of. Now I would put to you this question, and ask if it is not true. Have you not seen a field of wheat looking in the finest possible condition before it was in the ear—of the most healthy appearance, and standing as close together as it is possible, consistent with bearing heavy crops? and have you not seen, just as the corn comes into flower, something or other in the weather which causes a blight, which diminishes the grain—instances of which without end I saw last year—so that it becomes corn good for nothing but to be given to the pigs and the poultry? for the variations of the weather are things which no human being can stand against. On the other hand, have you not seen a field with the ears as heavy as you could wish; and yet we are apt to have, from St. Swithin to the end of the month, heavy thunder showers which lay the crops as flat as a roller, five or six weeks before it is ripe, so that the under part never is ripened; and the field which, in the month of June or July promised to yield 30, 35, or even 40 bushels of wheat per acre, yet, when it comes to be threshed out, you do not get 20 bushels per acre? Having mentioned these circumstances, I ask you if I have not made out my case in saying that corn, in spite of human ingenuity, must remain subject to the weather, and to the weather alone, and that it is impossible for any man to say beforehand what his crops shall be. Having said so much—and I fear, as connected with the toast, a little out of order, and I have gone further than I intended; but under all the circumstances I hope you will excuse me (loud cheers). It is true that I am not immediately connected with Newcastle or its vicinity but as you all know I reside in the district—I am a considerable landowner—and looking upon you all as friends and neighbours, I can assure you that I am as anxious for your prosperity and welfare as for my own; and it is this, and this alone, which induces me to say what I have done. Under these circumstances, I will not trespass further upon your attention, but will conclude with the toast which I have been requested to propose, "The Mayor and Corporation of Newcastle" (Loud cheers).

The **Mayor of Newcastle** rose to return thanks, and was received with loud cheering. He said :—Gentlemen, to me has devolved the duty of acknowledging the distinguished compliment which has been paid to the Mayor and Corporation of Newcastle ; and I assure you I consider that compliment much enhanced by the manner in which his Grace the Duke of Cleveland has proposed the toast (applause). The compliment which his Grace has paid to the local government of the town demands the thanks of the Mayor and Corporation especially (applause). A compliment of the kind coming from his Grace—a nobleman of such extended landed possessions in the country—a compliment paid to the local government of this commercial town by a nobleman so attached to all the interests and all the privileges of the landed proprietary of this country, is to me a congenial compliment (great applause). Gentlemen, I ought, in the first instance, to thank the members of the Royal Agricultural Society, in the name of the mayor and corporation, and in the name of the inhabitants of this town, for having complied with their pressing request to hold a meeting in their town, and in their neighbourhood (Applause). In a place not perhaps connected with agriculture particularly, but in the midst of a dense population, and conveniently situated between the banks of the Tees and the Tweed, where the choicest specimens of stock are to be found, but still not connected with agriculture as the great interest of the town. And, as such, the Mayor and Corporation thought it their duty to do everything in their power to promote the convenience of the society, and give it every accommodation in their power, and cheerfully have they performed their task. (Applause.) Gentlemen, I was about to say that this is not strictly speaking an agricultural situation. But if the skill and capital and enterprise of the inhabitants both of the town and neighbourhood are all devoted to mining and commercial concerns, still, gentlemen, following the Noble Duke, I shall say—I shall confess boldly, in the name of the inhabitants—that the greatest object of social interest is the prosperity of the agriculture of the country. (Applause.) At the same time, I should claim, in the striking language of the Noble Earl who proposed the former toast, I should claim as a principle, that two are engaged in it—that two parties are interested in the agriculture of the country. (Applause.) That not only those who give their labour, and their money, and their enterprise to the improvement of the soil, and the improvement in the different breeds of stock in the country, but also that there is another party connected with it—I mean the great consumers of the country. (Cheers.) And with proud satisfaction, in which this imposing meeting will join me, I will say, with every good feeling for the prosperity of agriculture, that they claim the importance of the class who contribute materially to the success of agriculture, by promoting the prosperity of the mining and commercial classes, by giving them the means of consuming the produce of the country. (Applause.) As an Alderman I ought not to speak upon agriculture, or pretend to descant upon it, but still one thing we know —we know the taste of good mutton. (Laughter and applause.) I would wish to direct the attention of this numerous body of strangers to the importance of this district as a consuming district. (Applause.) I would beg of them to examine the state of our great markets, and they will see we have a cattle market second to none but Smithfield—(loud applause)—a corn market where an immense sale of wheat takes place every week for ready money alone. (Loud applause.) Gentlemen, I beg pardon in intruding upon you in the form of returning thanks—(" No, no," and applause)—and I beg leave to thank the Noble Duke, and to thank his Royal Highness, and the other Noble Lords and Gentlemen, for the honour they have done to the Mayor and Corporation of Newcastle. The Mayor resumed his seat amidst loud and general applause.

Mr. **Grey**, of Dilston, on rising to propose the next toast, was received with loud cheering. He said : Notwithstanding the very kind reception which you have given me, I certainly cannot feel it but as a very arduous and grievous task for so humble an individual as myself to occupy the situation in which I now stand (applause). I have been in the habit of late, sometimes in this district, of addressing meetings of a similar character to this, on the great subject in which we take a common interest—the agriculture of the country ; but never did I anticipate being called upon to address a meeting so distinguished by rank, so imposing in number, and so important in character, as that which I have now the honour of addressing (applause). The toast which has been unhappily committed to me is "The Labouring Classes of the Land"—a subject to which no one can feel indifferent, whether regarded as forwarding the well-being of so large a portion of our fellow-creatures, or as exercising an influence over the welfare of the community at large, and the whole moral atmosphere in which they live (applause). Gentlemen, I should have satisfied myself with making these few remarks, and with announcing the toast which has been committed to my care, had not the toast been committed to me with the express wish that I would make some observations on the subject (applause). The man who is compelled to earn his daily bread by the labour of his hands cannot in any material degree alter his position, and improve his circumstances in life. The employment upon which he depends for the support of himself and his family arises from sources over which he can exercise no control. He is dependent upon others for employment, and therefore he must look to others for the means of elevating himself and improving his condition. The tenant farmer, generally speaking, is the party by whom the agricultural labourer is employed ; and much may be done for his benefit by the considerate kindness of his landlord. But then, again, the means which the tenant farmer employs, and the spirit with which he cultivates, most materially depends upon the terms upon which he holds his lands, and the encouragement he receives at the hands of his landlord. He depends on some one over whom he has no control, but who is also dependant on others, and must look to them for the means which will enable him to improve the labourers' condition. The tenant farmer is one to whom he must look ; but then, again, the tenant farmer's resources, means, and assistance, depend on the terms in which he holds his tenure from his landlord. Thus each is dependent on the other, so that all have an interest in promoting the welfare of the tillers of the soil. It is confessed on all hands that it is the duty of the landlord to supply the labourer with a decent house to live in, and to enjoy the conveniences of domestic life ; but in order to enjoy this, it is due to the tenant farmer that he should have his land on such terms as shall secure good and liberal treatment ; and just in proportion as the practice prevails so would be found the well-being of the labouring classes (cheers). No man can travel through this land without seeing that the condition of the tenantry formed a good test of the cultivation of the soil. Where the tenantry are poor and dispirited, the labourers are helpless and desponding, and in such condition of body and mind, neither the one nor the other will cheerfully till the ground. But on the other hand, where we find the tenantry and labourers well fed and well clothed, their children not squalid, but clean and healthful, there we may conclude that the cultivation is good (cheers). Now, this cannot be the condition of that portion of the tenantry who occupy a large part of the country as tenants-at-will and at annual rents (cheers). No system could put a more effectual check on agriculture, or the spirited improvement of the soil, than the system of annual rent and tenants-at-will. Two things are wanted to do justice to agriculture, viz., capital in the hands of the occupier, and knowledge to apply that capital in the tillage of the soil. For my own part, my experience of annual terms convinces me that they tend to make land unproductive, and to reduce the tenantry to a state of what I may call stationary ignorance (Hear). It had been argued in favour of annual terms that they tended to ensure good feeling between the landlord and the tenant, and that, where they do exist, very few changes occur. I admit that a good feeling between a landlord and his tenantry was a strong bond of union, and that reciprocal kindness of feeling between them would do much to promote and perpetuate their mutual good. But he would ask, was it true that the feeling was more strong between the landlord and his annual tenant, or between the landlord and the tenant on lease, and whose landlord was capable of appreciating improved cultivation, and to whom he would be prepared to give a fair preference when the time came that his lease had to be renewed? The present is not the time to go into that subject as I should like to do, or I might easily show, from cases within the circle of my own knowledge, that farms on leases had been continued through several successive generations, and that the rents had increased from 200*l.* to 300*l.*, and from 300*l.* to 700*l.*, and from 700*l.* to 1,000*l.*, without any extra expenditure beyond the expense of the building, and none on the part of the landlord beyond what he would have to pay to a tenant on annual rents; while under a state of annual terms the farm would have increased only half (cheers). It is all very pretty in language, and poetic in sentiment, to say that in the kindly feeling between landlord and tenant lay the best security that the farms would be perpetually occupied by the tenantry-at-will; but, stripped of this sentimentality, what did it mean practically but that the state of things under the father should continue to be the state of things under the son? The father was illiterate, and did not teach the son knowledge; rushes grew before in the ditch—they grow in the ditch still; the old house was patched and mended in the days of the father—it is patched and mended in the days of the son. The son indeed has heard of draining, and of improved cultivation, but Mr. Smith, of Deanston, had never been there; and the same scanty crops are now reaped by the son, which the father and the grandfather reaped before his day (cheers). He certainly was of opinion that where there are tenantry at will, there the land is worse cultivated; and where there were leases, there it was best. Some instances there may be in which farms were well cultivated and the tenantry comfortable; but these were exceptions, not the rule; generally it would, I find, be under leases that the farmer would be disposed to lay out his capital, and feel himself most strongly disposed to improve the land. It may be all very well where annual terms exist, so long as the landlords feel disposed to assist him to cultivate the soil; but in this there was no solid security. No man would lay out his capital on it who thought well on the mutability of human affairs; and they all knew the fact that "there did arise another king, who knew not Joseph" (cheers). Without the security of leases all will be uncertain; and until that security be generally given, the tenantry will not be in a condition to do justice to themselves and the labourers they employ. Another argument had been urged in favour of the system of tenantry at will, and that is, that the tenancy at will or in annual term do not want a change. There may be, and there no doubt are, some who have this feeling; but I know others who view with jealousy the improvements of their neighbours at lease, and would gladly exchange the annual tenancy for terms which would better enable them to cultivate the soil. There are some who feel that if they improve the land the rents would be raised, and, on this ground, do not want a change, it being their feeling that it is

> "Better to bear the ills we have,
> Than fly to others that we know not of."

But such I repeat is not the general opinion (cheers). We have been told that there is a limit to agricultural improvement. I am extremely nervous about it (Hear, hear, and cheers). It will not be reached in our day (cheers). So long as we have unimproved land and tenants at will, we shall not reach it (renewed cheers). But our duty to the labouring classes is not fulfilled when we supply them with that which will merely minister to their physical improvement (hear, hear). We have a higher duty to discharge to them—we have to attend to the cultivation of their minds as well as their bodies; but it is ours to care also for their souls, and if we would elevate them in character and in feeling—if we would open to them those fields of intellectual enjoyment, from which by reason of ignorance they are too generally excluded, and, above all, if we would teach them to live and to act in those scenes of moral obligations which as accountable beings and moral agents are imposed upon them, we must give to the rising generation a better system of education, and that education must be blended with moral and religious instruction (applause). I beg, in conclusion, to give the toast which has been placed to me, and to wish that long may the hamlets and peasantry of England send forth their shouts of health and joy—long may our golden harvests be gathered in peace and in plenty, and may all classes of this favoured land unite in their efforts for the general good, and exhibit to the world the spectacle of a powerful, a prosperous, a happy, and a loyal people (great applause).

Professor **BUCKLAND** came forward to propose the next toast, and was received with loud cheers. He said—I rise in obedience to the commands of the members of the council of this great society, for the purpose of proposing to you a toast which needs not one syllable of commendation from me, and which, I am sure, will be received with enthusiasm, when I mention the name of your President, Lord Portman (loud cheers). It was my honourable and gratifying duty, six years ago, at the first meeting of the great national society—held within the walls of the university town of Oxford—to have the great honour of having the name of so honourable an individual as himself enrolled amongst the members of this great society (loud cheers). Your lordship will do me the favour to recollect that thrice six years ago I had the honour of counting your lordship as one of the most attentive pupils of my laboratory—(loud cheers)—and that then I had the honour of giving your lordship some instructions in the nature of those soils from which human food is provided (cheers). Your lordship will, perhaps, permit me to remind you that it is on the industry of man that the fertility of the land depends (cheers). The farmers of this country have been, upon the whole, skilful carriers out of the principles required by nature, though they have not themselves been acquainted with the scientific principles on which their success proceeded (Hear, hear). We are now overwhelmed, as it were, with the application of mercantile skill to agricultural purposes; and I trust that these approximations will be beneficial, not only to the agricultural interest, but to all mankind (cheers). I hope that the skill displayed by the manufacturers will be emulated by the farmers. There are operations of nature which it is necessary that you should understand. I do not wish you to enlist your sympathies either with Mr. Parkes or with Mr. Smith, of Deanston (Hear, hear). It is for you, I think, to apply the general principles laid down by both gentlemen; but to be guided by the peculiar circumstances of the case. You must all of you have felt the obligations due to Professor Johnston, who has not only delivered and published a course of lectures most important to the agriculturists, but who has also rendered essential service by his remarks of yesterday. I need not state to you how inestimable, how valuable, how enormous is the influence of colossal meetings like the present. I need not remind you how great has been the influence exerted during half a century of that society, whose child—legitimate child—we boast ourselves to be: I mean the Highland Society of Scotland. But the point which I would more than all urge upon the present meeting is this—the necessity of cultivating—most strenuously cultivating—the example of this society of tenant farmers for the purpose of putting themselves into direct and constant communication with a professor of their own, from whom they can obtain official information at an expense which—compared with benefits—is absolutely insignificant. You know, my lord, the benefits that local farmers' clubs have already conferred on many counties in England. The Mayor of Newcastle will permit me to congratulate him on the establishment of a farmers' club next door to the Philosophical Society in this town. And I trust, my lord, that every year will see our farmers' local clubs meeting together, not as their grandfathers used to do, to discuss the excellency of beef and mutton, and a little beer and brandy too, but I trust, to sharpen your intellect with the alcohol of chemistry—to enter into philosophical discussions as to the value of manures—and to obtain information as to the economical expenditure of that which your own farms are capable of producing from a good professor of chemistry. Lastly, my Lord, I would mention one other association which is to meet in the course of September, at Southampton; an association whose president for the present year—Sir Roderick Murchison—I have the honour of seeing placed to my right, and for whom I will dare to affirm that your Lordship and every other member of this society who will honour the association with his presence, we shall give a hearty welcome. On that occasion we shall not only give to such of you as attend a most hearty welcome, but we shall claim you as the legitimate progeny of that parent British Association for the Advancement of Science; for it was in the meetings of that society that this society originated (Hear, hear, hear). It was a rebellious faction for whom we had not room within our minor theatres that burst forth from our contracted walls, and rose at once as a giant from his native earth (applause). Gentlemen, I have to apologise for trespassing on your attention so long—("No, no")—and I again rejoice in having the honour of proposing the toast that has been committed to me—namely, "The Health of our President, Lord Portman." (Loud and continued cheering.)

Lord Portman, on rising to return thanks, was received with renewed applause. When this had subsided, he said—I may be allowed to address you, not only as brother members of this great society, but as brethren, occupied with myself in the great task of endeavouring to cultivate the soil and improve the stock in the best manner in our power. Brethren, then, as members of the same society—brethren, as engaged in the same great occupation, let me thank my very Rev. Friend, who has told you that I had the good fortune to have learned attentively at his tribunal. I can assure you with perfect truth that much that I carried from his room has materially assisted me in the cultivation and the improvement of the soil. He told me that where sand was to be found near the surface, probably clay was not far off; and that little scrap of knowledge enabled me to establish a clay-yard to make bricks in the middle of a chalk district of Dorsetshire. Now, gentlemen, when first you called upon me to undertake the office of president of this great society, I considered within my own mind how I could best fit myself to discharge the great duty which you imposed upon me; and I thought that I should best discharge it if I could understand the principles upon which your society was formed, and how it was that you had obtained such a position—such a rank among the great societies of the world. And, gentlemen, I soon satisfied myself that the causes were to be found in your constitution, and in your devotion to practical agricultural facts. I found your constitution to be based upon liberty of opinion to the fullest extent upon all subjects; liberty, controlled by order; liberty, regulated by virtue—I found, gentlemen, that your next great polar star was your determination that your study should be confined to agricultural, practical fact; and that again I found was supported mainly by and dependent upon the cardinal virtues—dependent upon patience, for no improvements can be made but by patience and long continuance. I found, again, that you called to your aid truthfulnuss—truthfulness in the extreme—for you require not only to know of the successes of your members, but of all their failures (hear). I found, again, that you were guided by submission to the will of God; for as my noble friend near me has stated, the seasons must be taken into account, and unless the farmer bring a well regulated mind, as a good creature of the great Creator, he can be no fit member of this society. He must remember that the same God who sends the storm and the tempest to blight his hopes, sends him the gentle dews and the airy breeze, which make him to prosper beyond his expectations. I found, again, that you had one more distinguishing feature, and I glory to belong to a society that has it: you repudiate all humbug—all clap-trap (loud applause). You will have nothing told you that is merely pleasant and agreeable for the moment; you require facts, honesty, and open dealing (applause). These were the feelings which have guided me in my course. Here am I, standing upon my trial; not the trial of my industry (for, as far as the powers of my mind and body go, I am sure that I am industrious), but I stand upon my trial as to my firmness in maintaining your principles, your freedom of opinion, and the interchange of every individual's knowledge. Now, gentlemen, I think it is my duty to state to this meeting some of the results which have attended the progress of this great society. I must remind you that we have held seven great meetings prior to the present; more than half a million of the people of this country have paid their money for admission to see your exhibitions; this society, in the towns where it has hitherto been, has expended 37,000*l.*; we have paid 11,000*l.* as prizes to the competitors at our show yards; we have circulated gratuitously 70,000 copies of the journal of the society among the members; we now number nearly 7,200 members, having added to our numbers since the meeting at Shrewsbury almost 600 individuals. I tell you that in the year 1839, at our first meeting at

Oxford, we had 249 head of stock entered for show: at the meeting at Newcastle we have had 613. (Cheers). I tell you that at Oxford we had entered for competition amongst implements, 22; at Newcastle we have had 732. (Cheers). Now gentlemen, I was present at the birth of this great society. I have been permitted to live long enough to see these great results; but I cannot but feel that it has been somewhat painful to me in looking back for the purpose of collecting these facts for your information, that I have to lament in the past year, and in my presidency, the loss of two of the greatest of our original founders—men whom no one who knew them could fail to love; men whom all members, whose numbers I have recounted, have hailed with delight when they have seen them; men for whom it is impossible for those who, like myself, were intimately associated with them not to mourn; but I feel that better had it been had they been spared and I had gone to my last home instead. I need not tell you that I mourn the late Lord Spencer; and our equally lamented friend Mr. Handley. (Respectful pause for some moments). We were then all full of hope, we laid down that fundamental principle which I affirmed to you at an earlier moment, we have reaped the fruit at which we have arrived—see this glorious assembly; we see that our foresight was right; that being foresighted we have been pre-armed; we were armed with arms which we have used all in their proper spheres at a proper time, and we are all met together in peace and harmony. (Cheers). I think it my duty to express, in our name, the gratitude we cannot fail to feel for the great local aid which we received from the agricultural societies formed about this district, as well as from the authorities of Newcastle. I also feel that it is due to the Duke of Northumberland to thank him for the way in which he has done his utmost to bring us here. (Cheers). He has placed a sum of money at our disposal for prizes, and has taken every means in his power to make this meeting agreeable to those who have come from the far south here to meet him. Now on looking at this district, I find it is a district much more occupied with underground employment and commercial business than with agriculture or the improvement or tillage of the soil; and I cannot but hope that we have been useful in the place we have selected for our meeting, our object being to improve the districts in which we hold our meetings. (Applause). For I must say I have not seen, in my recollection, any district so much in need of drainage—in which the farmers are so exceedingly fond of that variety in their fields which I have not met with in this district. (Cheers). Whether it is desirable that cereals of various kinds should grow in their fields or not, I have yet to learn; but sure I am of this, that neither poppies nor camomiles, nor thistles, have much to do with a field of wheat. (Cheers). Your stock I think deserving of the greatest praise. Your sheep may be a little improved perhaps. The population, I must say, is a gratifying sight for any one who comes from the South of England. I am afraid there are not many here from those districts, but I hope that we shall take back lessons in that respect which will be of service and great advantage to them. (Cheers). I think we have had a feature in this meeting which we must hail with satisfaction, and which I hope will bear it to be repeated at future meetings. We have been contented with one great dinner, and we have devoted the other days to practical discussions on the most important subjects. We had the benefit on Tuesday of a most valuable discussion. We had last night the opinions of gentlemen on another subject. We have, I hope, the prospect of a great controversy; and we, the farmers of England, shall, through the exertion of these two distinguished men, arrive at something like a good result, and enable us hereafter to satisfy ourselves on our own land of the best system of draining the land on which we live. Now, gentlemen, when I look at this great assembly—when I consider the great area in which we are collected—when I consider the object for which we have met—when I remember their moderation in prosperity, their forbearance in adversity—when I remember their loyalty for the Sovereign and love for their native land, which the farmers of this great land manifest as represented by you, I do feel proud—I own I feel proud—and I hope for the first time in my life, at being present at such a meeting. I feel grateful to all of you for the great confidence you have shown me, for the great support given to me, whether as member of the council, secretary, member of the local committee, or an individual member of the society; I feel grateful to you each and all for the confidence shown to me, and I hope, having the pleasure of having a child in this room, he will take away an impression which will long survive in his memory (loud cheers). I hope the futurity of this society may be as bright as its past course has been—I hope my noble friend opposite me, and his successors, will excel me, as I have tried to excel those who filled the office before me. I hope that as you increase in numbers and strength you will find stronger and more able men year after year to fill this great place. I hope that by the increase of your members, and the extension and distribution of knowledge, you will show to the people of the world the usefulness of a Royal Agricultural Society of England (enthusiastic cheering).

Viscount MORPETH next rose, and was received with loud and general applause. His lordship said: My Lord, may it please your Royal Highness, my Lords, and gentlemen, I have been honoured with a command to propose a toast, and in very briefly complying with that demand, I certainly most anxiously desire not only that I may not utter a word, but that I may not even suggest an idea or awaken a recollection which could possibly disturb the harmony or ruffle the complacency of the present meeting. But I feel that I may at once dismiss any such fear, when you remember, gentlemen, that none here came before you in any political or official character, and that the only capacity in which I could wish to be considered by you, is that of a neighbouring borderer, whose predecessors may occasionally have been occupied, perhaps more energetically than lawfully, in plundering the beeves and harrowing the flocks of their Scotch fellow-marchmen (cheers and laughter), in those old times, before cattle shows and agricultural societies were invented—when the business of the market was not very regularly carried on—when there were more blows than siller (laughter); and who rejoices to live at this more settled era, when the herds and flocks of our Scotch neighbours may descend the valley of the Tyne in a more regular guise (laughter), when we may all enter into amicable and honest competition; and when we, on the south side of the border, may match even northerns themselves with the produce of that herbage and tillage of those regions which were alluded to with so much truth by your public-spirited Mayor, whether on the Tweedside or on the Teeside (cheers). You will feel, I think, that one of the most obvious and important benefits of such a society as this, is, the opportunity which is given to the more backward and less enterprising portion of the agricultural community to find out and ask what may be done—what has been done—in the most adverse district, and by the most successful men. Far be it from me to enter into any of those topics which are matters of dispute with respect to the mode of operation. I shall not venture to introduce any crude ideas of my own upon this high council and cabinet of agriculture (applause). My noble friend, your excellent president, has announced to me that you are going to open a great controversy, and to dispute between the merits of deep and shallow drainage—a dispute most worthy to succeed the battle of the broad and narrow gauges (loud cheers and laughter). Whether it is necessary that the agricultural energies of this country should now receive any additional impulse—which, somehow or other, seems to be generally thought—certainly I think you will feel that that object can be best obtained by giving the utmost attention in your powers to all improved processes, and to all scientific discoveries, being careful, at the same time, of testing them by the careful application of experiment, of every day practice, and, above all, by providing a sound, a systematic, and, if I may so say, even a professional education for the rising race of English farmers (loud cheers). Upon all accounts do I rejoice at this goodly gathering (cheers). I rejoice in the intercourse they occasion—in the information they impart—in the ideas they awaken—and in the model they exhibit; and I am sure you will feel, after this day's experience in the show-yard, that that individual must have a strange and fastidious taste who was not satisfied with the specimens exhibited (loud cheers). I believe it is known upon good authority that an illustrious foreign prince, who has recently visited our shores—I wish he had been present on this occasion, together with our own illustrious prince of our own good old soil—I am told that Ibrahim Pacha, after his visit to this country, among all the specimens of beauty exhibited to him, manifested the greatest admiration for a certain roundness and plumpness of proportion (uproarious laughter and cheering). Now, I cannot but think that if his highness Ibrahim Pacha had been here, he would have found much to admire in English cattle as well as English ladies (loud laughter and cheers). But, at all events, he would not have complained of their being too slight and sylph-like in their proportions (loud cheering and laughter). He would have, I am sure, especially applauded the smoothness of outline, and the filling up of all angular cavities which they displayed (continued laughter). But though your President has not yet called me to order—(laughter)—I am reminded by the paper before me that I have wandered far from the subject to which it was my business to advert. I am sure we shall all be agreed upon the fact, that the satisfactory and efficient working of such an institution as this must depend in an especial degree upon the intelligence, the independence and the impartiality of the selected judges (applause). Now, I believe no one who has examined the decisions of those gentlemen will be inclined to deny to the judges of this exhibition the happy manifestation of these qualities (loud cheers). We must all feel that they have had a delicate and onerous task imposed upon them, when they had to select not only amidst such a variety, but a variety of such excellence. They must, however, recollect, at the same time, that while we fully appreciate the arduous nature of those duties, that it is a high compliment paid to them in having been selected as competent to pass a judgment upon their fellow improvers of the soil (loud cheers). I certainly cannot take upon myself to answer but that some proprietors of stock, and some manufacturers of implements, may imagine that the award of success ought just to have been appropriated to themselves; but however that may be, sure I am that such an audience as I address will form a competent opinion upon their respective merits (loud cheers). Gentlemen, we would, for an instant, depose the judges of the society, upon this occasion, for a short time, and would place them upon their trials; and certain I am that you, my lord and gentlemen, will give them a speedy and safe deliverance (cheers). And it is with the utmost good will and sincere gratitude to them, and feeling confident you will join with me, that I propose success and prosperity to the judges (loud cheers).

Mr. Torr, of Riby, said—The duty now devolves upon me of returning you, on behalf of my colleagues and myself, our gratitude for those kind expressions of approbation which has been evinced to us by the manner in which you have received the last toast (cheers). We cannot but duly appreciate the compliment which Lord Morpeth has paid us: 1st, to our intelligence; 2nd, to our integrity; and 3rdly, mainly to our impartiality (cheers). We can assure you that, if we have failed in the first, it has been purely from want of knowledge. I think we have not failed in the second, and I am quite certain we have not failed in the third. I can assure you, gentlemen, and I know that I am addressing many who have occupied the same situation on former occasions that I have done at present—that the office of a judge in a society is an onerous undertaking, and has a peculiar responsibility when connected with a society like the Royal Agricultural Society of England, which, as your President has told you, has dispensed upwards of 11,000*l.* in premiums since its commencement (cheers). I have the authority of my colleagues for saying, that we consider this exhibition to be greatly improved in many of its branches upon former exhibitions—particularly in regard to the short-horned cattle and implements. With regard to the first, it might be said that if they were not improved, we would have been disappointed indeed, as the society has, on this occasion, held its meeting in the classic land of short horns. With regard to implements, we consider that there was never before exhibited before the society more useful or better manufactured implements (cheers). I may here observe that in the office of a judge, the business of an individual ought to be to direct his attention to come to the truth: for it is that principle, and that principle alone, which will enable us to improve agriculture or agricultural implements. It is self-evident, even in the exhibition of stock, that a power does exist which carries with it, and denotes an ability to produce a larger quantity of meat upon the same quantity of food. This is the law of nature; and it is the same with regard to implements, where simplicity and cheapness, with ability to do their work, is the thing to which we must look. But desirous as we may be, as no doubt we are, of our land being well stocked with the best cattle, and our tillage worked with the best manufactured implements, still there is something beyond even these exhibitions—the prizes you dispense and the judges who are to award them, which is necessary to produce them; and with your leave, my lord, I will tell you that capital alone can bring them (cheers). The time has now arrived, when capital, whether in agriculture or manufactures, or in any art or science, must be the means of bringing forward every good and beneficial result. I mean capital well employed (cheers). I hold the argument that, if this capital cannot be supplied by the tenant, then, to a certain extent, it must be done by the landlord. It is self-evident, that in many districts the tenants are not able, and in some they are not willing to supply the capital—and for very good reasons; because they have no certain prospect of return (Hear, hear, hear). In this respect I agree with the excellent observations which have fallen from Mr. Grey, of Dilston (loud cheers); an authority which it would be difficult to equal in her Majesty's dominions. I have to add my humble testimony to that of the hon. gentleman. I most fully concur in the observations made, which I am quite sure, from the position which Mr. Grey holds in society, not less than from the character I know him to possess, that he would not have made these observations unless he were fully convinced of their truth (applause). I am quite certain that a new era is about to dawn on, I may say, the agricultural horizon; and in commercial principles, that labour, which is the source of capital, shall have its just reward, and the labourer be able to support his independence. The labourers of England, in my recollection, have become much more independent in their station than they were in formerly. I trust the independence of the tenant will be followed by that of the labourer. I shall not, on this occasion, say more; but perhaps I may allude to a remark made by Lord Morpeth as to the state of agriculture in this northern district. The view obtained in a hasty journey by railway is not sufficient to enable a correct opinion to be formed of the agriculture of the country through which it passes; but if the Noble Lord had extended his ride a little further north, he would have found the land in a much higher state of cultivation than in the immediate neighbourhood.

Mr. **Bell**, M.P., on rising, was received with loud and enthusiastic cheering. He said: I have been requested by our most excellent President to propose a toast, and it is this, "The Highland and Agricultural Society of Scotland, and the Royal Agricultural Improvement Society of Ireland" (applause). I can safely say, gentlemen, that I wish that toast had been entrusted to worthier hands—to one more fully competent to do justice to it than I am (applause). Having undertaken the duty upon a short notice, I hope you will be disposed to deal leniently with me (applause). Gentlemen, when I look around me, and see now assembled within these walls, not speculative theorists, but sound practical men; and, gentlemen, I trust, from the position I have the honour to hold in this county, through the kindness of my friends, many of whom I now see around me, I may express without presumption the high satisfaction I feel that his Royal Highness the Duke of Cambridge had thought proper to honour the society with his presence in the county of Northumberland—(applause)—and it is extremely gratifying to find the illustrions Prince meet from the hands of the men of Northumberland that reception which his Royal Highness deserves, not more from his position in society than from the many amiable qualities that adorn his person (loud cheers). It will contribute to strengthen the union between landlords and their tenantry and labourers. The three classes are united together, and it was always intended that their interests should be treated as one. There may be a few who feel that this institution has merely made agriculture fashionable; but we maintain they have done more—they have simplified that which was difficult—they have introduced science where formerly there was none—they have removed prejudice against scientific husbandry, and induced the farmer to turn his attention to the scientific improvement of the soil—and, above all, they have taught him that knowledge is not only power, but wealth —(cheers)—they have led to a closer and a more friendly intercourse between landlords and tenants, by inducing the landlords to reside more closely on their estates, and give their best attention and encouragement to the cultivation of the soil. Thus it is that they have been brought into that friendly contact with their tenantry, and thus it is they are led to seek the protection of each other's good. We see the results of all this in the improved farming of Scotland and Ireland now, as compared with what it was 25 years ago; inasmuch as we have rich and luxuriant crops growing now, where we had only barren lands and swamps. It is therefore desirable that these institutions should be encouraged, as in their prosperity we have nothing to lose, but every thing to gain. Among the very useful information these societies have imparted to Ireland and Scotland, is the fact that no land under experiment for improved cultivation can be said to have had a satisfactory trial that has not been thoroughly drained; that is an improvement which lies at the foundation of all other improvements. It is experience, but it lies with the landlord to carry it out; and in doing so, he will find that he could not have a better investment for his money, or take a more effectual mode of improving his estate (cheers). I advise farmers also, that in draining they should take care that their drains are not too shallow, as effectual drainage can only be obtained where the drains are deep (Hear, hear). Remember that land half drained is money thrown away. After a few complimentary remarks to the two societies which formed the subject of his toast, the hon. gentleman concluded by stating that he had the honour to be requested by his Grace the Duke of Northumberland to convey to his Royal Highness the Duke of Cambridge, to Lord Portman and other members of the society, his apology for not beng able to attend the meeting on account of the infirm state of his grace's health, and to assure them that no one had the interests of the society more sincerely at heart.

Lord **Polwarth** and Colonel **Archbold**, M.P., returned thanks on behalf of their respective societies.

The Hon. H. T. **Liddell** said—Gentlemen, the council having done me the honour to depute to me the last toast upon the list, I trust you will listen to me the few moments I shall feel it necessary to trespass upon your attention. I propose this toast under some disadvantage, being that I have not the honour of the personal acquaintance of the noble earl, who is destined to succeed my noble friend in the presidency of this great society. Had I possessed the pleasure and honour of that acquaintance, I might have been enabled to do, what I can now only do from report, expatiate upon his fitness for that office, and assure you that he has devoted his talents and attention to the cultivation of the land (cheers). But in proposing to you the health of the President-elect, let me not forget to remind you of the manner in which our existing President has discharged his duty (cheers). With that modesty which is inseparable from merit, my noble friend Lord Portman has expressed whether that the noble President-elect should excel him in the manner in which he has discharged his duties, the noble earl will have a difficult task to perform (a laugh). You must all have known the good sense and the good feeling which have characterized that presidency (cheers). I could have wished that my noble friend had connected by a little experience the just lecture which he read to the farmers of Durham on the lands of this immediate neighbourhood and the line of communication which passes through the country. I can assure my noble friend that if he could have extended his observations a little further north, east, or west, he might have met with cultivation which never has shamed the best cultivation in any part of England (cheers). Connected as I am with this district by property, by those ties of attachment which naturally bind a man to the land of his birth—connected as I am also with you by considerations of public interest, I feel it would be unbecoming of me to omit making this observation, which I do with the utmost deference to my noble friend, but which I feel is only just to the cultivation of my native land (cheers). As this is the last toast, I will not prolong the business of the evening; but let me congratulate you upon the whole proceedings of this eventful day (cheers). Not only upon this imposing display we see before us in the assembly of this day; but we also call your attention to the order, regularity, and comfort of your proceedings on the moor; to the quantity, quality, and improvement of the stock, and the utility of the implements; and that we also state that the pleasure has been enhanced by the serenity of the weather (cheers). As I am now addressing you, I will say that illness has also prevented a near and warm relation of mine from appearing before you; and before I sit down let me unite with my hon. friend the member for South Northumberland in expressing, in the name of the whole of this assembly, the gratification they receive from the presence of the illustrious prince of the blood who has honoured us upon this occasion. That illustrious individual has only to show himself in any part of this kingdom to be received with that distinction which so properly is due to him; and let me express, in the name of my revered father, the satisfaction it has given to him, after the long friendship that has existed between him and his royal highness, that that illustrious prince has taken advantage of his residence near to this town to visit this part of the country, and which I trust he will not leave with regret. Gentlemen, I will detain you no longer. I have been greatly gratified by everything I have witnessed this day. I trust the next meeting of this great and increasing society will be found to be still increasing in numbers, wealth, and usefulness; and that the president we shall elect to-night will equal his predecessor in all the qualifications necessary for that high office. With these observations, I propose "The health of the president elect, the Earl of Egmont" (loud cheers).

The Earl of EGMONT said, he begged to return them his most heartfelt thanks for the especial honour with which they had received his toast, and the gentleman who had so handsomely proposed it. He regretted the office to which they had elected him had not fallen into abler hands; but in returning thanks for it he would take the opportunity of stating a fact, which it might have been useful to them to have known at an earlier period. They had heard much of draining and manuring land, and the fact he had to tell them was, that a vast quantity of what was called and sold for guano, was nothing but the refuse of the copper mines in Wales, which had been shipped and sent for a cruise in the Channel, and brought back and sold to the farmers as guano. This was an undoubted fact. He had himself used guano, and found that it effected great good. The noble lord, who was indistinctly heard, in conclusion returned thanks to the Mayor and Aldermen of Newcastle for the great hospitality and attention they had shown to the members of the society, and said, should they honour the next year's meeting, at Northampton, with their presence, he should be delighted and proud to see them. The Society might depend, that whatever could be done to promote their interest by so humble an individual should be done, and he trusted that when he should come before them again, he would receive justice at their hands and a favourable consideration (loud applause).

The whole proceedings closed at about half-past eight o'clock. They were conducted with admirable regularity, and in a manner which reflected credit on the managing stewards. Notwithstanding the immense number assembled, the temperature of the pavilion remained throughout pleasantly cool. The dinner and wines were provided by Mr. Haigh, of the Assembly-rooms, and were worthy of his reputation as a caterer for such assemblies.

GENERAL MEETING.

A general meeting of the members was announced to be held in the Music-hall, at 12 o'clock on Friday. Scarcely twenty gentlemen, however, were present.

Lord PORTMAN occupied the chair for the last time. His lordship read a letter from the mayor of Newcastle, in which his worship said he could not omit the opportunity of expressing his thanks for the great courtesy with which he had been received by the president, council, and members of the Society, and the extreme gratification the inhabitants had derived from the late splendid exhibition (*applause*).

It was carried unanimously, that the secretary should answer the letter, and convey the thanks of the Society to the mayor.

Mr. PYM said the next resolution was, that the thanks of the meeting be given to those railway companies who had promoted the objects of the meeting, and for their arrangements for the accommodation of exhibiters.

The CHAIRMAN said there could be no doubt about that vote; but, at the same time, it was absolutely necessary that some notice should be taken of the proceedings of some of the railway companies. His own opinion was, that the best mode of taking such notice would be, that the cases, some of which were now in his hand, should be laid before the next monthly meeting of the council, by which time a great many facts would have been collected, which would enable the council to determine whether any communications should be made to particular railways. His lordship then read a few instances of high charges for men and cattle between Birmingham and Derby, and from Derby to Newcastle; the total being £29 12s. 6d. for the conveyance of eleven head of stock and three men, occupying only three trucks for the whole. In one case the charge was about one-fourth more than the ordinary charge. He knew there were a great many other cases which could be equally verified. One of them was reported to the manager at the Newcastle station, who stated that, if he had been at the other end of the line, the charge would not have been made; but when requested to give an order that the money should be returned at the other end, he said he did not think he could take upon himself to do that. These were a sort of cases which really ought to be made known to the public, for the council ought to do all in their power to protect exhibiters.

Colonel CHALLONER inquired if the chairman did not think they ought to suspend their vote of thanks till all the cases were properly brought before the Council.

The CHAIRMAN thought it would be better to enumerate those railways which had afforded the Society proper facilities, and not to take a general vote. He knew the subject had been mentioned to Mr. Hudson by an M.P. (we believe his lordship said Mr. Bell), and the answer made to that member of parliament satisfied him that Mr. Hudson knew something about it. At all events he (the chairman) was quite sure the matter ought to be made known to the public. If competition were wanted anywhere, it was wanted in a district of this description.

It was then carried that the thanks of the meeting be given to the Newcastle and Carlisle, the South Eastern, the London and Birmingham, the Grand Junction, the Great Western, the South Western, and the Newcastle and North Shields Railway Companies, for the facilities and accommodation they had afforded to the stock and attendants travelling on their respective lines. [We believe the railways by which extravagant charges have been made are the Bristol and Birmingham, the Midland, and the Newcastle and Darlington.]

Colonel **Challoner** moved the thanks of the meeting to the local committee for their exertions, and for the accommodation they had afforded the members of the Society in every respect since they had been in the town of Newcastle.

Mr. **John Kinder** seconded the motion.

The **Chairman** said they were infinitely obliged to the local committee; and he hoped that Sir Matthew White Ridley would assure them, personally, that they did not think anything could have gone off so well. The steward of the dinner room told him that the local committee gave him every assistance. In short, every body connected with the Society felt the great value of the aid rendered to him by that body (*applause*).

Sir M. W. **Ridley** acknowledged the compliment on behalf of the committee, and could only say they had all exerted themselves to the best of their ability.

Mr. **Parkes** said he should like to have thanks voted to all the people, for really they were the civilest people he ever met with (*Hear, hear*).

The **Chairman** said it would be better not to travel out of their usual course, in moving any vote of thanks; because if, as a body, they thus marked their sense of some great attention which had been paid them, it would look invidious if they did not do the same on future occasions. But it was right to state that they were infinitely obliged to the postmaster of Newcastle; for the accommodation he had afforded to the Society had been immense (*applause*). The number of letters received was very great; and he had given such facilities to the secretary, and to all parties concerned, that it was due to him that he should know they felt very much obliged to him, though he did not know that it was quite safe to take a special vote of thanks.

Mr. J. L. **Loraine**, postmaster, observed, that being the individual alluded to, he considered himself highly honoured by the notice which had been taken of him. It was his wish, and always had been, to accommodate the public, to accommodate every man, indeed be he high or low. Anything which had been done in his office to accommodate his lordship or the strangers, had received his entire approval (*applause.*)

Sir M. W. **Ridley** moved the thanks of the Society to Professor Johnston and Mr. Parkes, for the lectures they had delivered during the week. They had been instructed and gratified by the able manner in which those gentlemen had introduced their subjects.

Mr. **Shaw** seconded the motion.

The **Chairman** said the audiences were not only so attentive that they must have taken away valuable information, but he was glad to find they had the good sense not to promote a vote of thanks in the room to the parties who introduced the discussions; for he thought nothing could be so disagreeable to those gentlemen as to have that sort of vote of thanks from the audience attending the meeting. They were exceedingly gratified at their attention; but the present meeting was the right place to pass such resolutions. The motion having been carried,

Mr. **Parkes** returned thanks, and said he had never before witnessed so attentive an auditory. He might perhaps be allowed to take that opportunity to correct an error in one of the public papers, which stated that Mr. W. B. Webster had detailed his (Mr. Parkes's) charges for draining some land for the Duke of Cleveland. That was incorrect. Mr. Webster himself stated that the land belonged to Mr. Whitmore, but that the account of the charges had been given him by an agent of the Duke of Cleveland.

Colonel **Challoner** apprehended they should not go into such things at that meeting. He then observed that he wished some more important member of the Society would rise on that occasion to perform the duty he was about to undertake—nevertheless it was a duty which every member of the Society, and every person who had witnessed the proceedings of the meeting, must feel ought not to be neglected. They never had had the business of their annual meeting conducted in a manner more efficient—(he was going to say so efficient, but that might appear invidious)—so thoroughly, in every respect, courteous to the Society, and courteous to the public—than had been accomplished by the conduct which their president had displayed on this occasion. He therefore had no hesitation in proposing to them to return a vote of thanks for the kind manner in which Lord Portman had conducted himself in the chair from that time twelve months up to this day, on which he resigned it. He had the more pleasure in making this proposition, because he believed that there was not a member of the Society, nor a single individual in the town of Newcastle, who had viewed the proceedings, who would not concur with him in the propriety of returning cordial thanks to the chairman (*applause*).

Mr. **Pym** seconded the motion. He would not add one word, for he agreed with every syllable that Colonel Challoner had pronounced.

The **Chairman**, in returning thanks, said it was a great satisfaction to him to have been supported in the way he had been. As bound in duty, he had tried to do his best, because he thought they had a right to expect that he would do so; but he must say it would have been quite impossible for him to do anything, if he had not been aided as he had been. The council had supported him nobly;

the secretary had been of invaluable assistance; and he felt that every officer of the Society was quite as much entitled to thanks as himself. All had done their best; and he begged to assure his noble friend who was about to take the chair, that he might rely upon receiving every support they could give him. Indeed, they were all bound to support each other. He (Lord Portman) had been unfortunately circumstanced, by the loss of one of his best friends, and by the absence of the Duke of Richmond, whose assistance, from his experience and knowledge of the Society's business, would have been invaluable at that meeting. His noble friend and successor in the chair should have all the assistance he could give him. He hoped to be at the next meeting of the council, to assist him; but he had sacrificed the duty of attending a sick wife in a foreign country, because he was engaged to seven thousand people at home: and, so soon as it was in his power, he must join her abroad. He again thanked them for their generous support, and now welcomed his successor to the chair.

Lord EGMONT, the new president of the Society, took the chair accordingly, and forthwith convened a special meeting of the council, when the rest of the company departed, and thus closed the proceedings of this national gathering, the remembrance of which will afford pleasing reflections to thousands.

THE SALE AT THE AUCTION.

The meeting of the Royal Agricultural Society in this town was formally closed on Friday, when the stock and implements marked for sale in the catalogue were brought to the hammer. The cattle and horses were sold by Mr. Wetherell, of Durham, and the sheep, pigs, and implements, by Mr. Chrisp, of Newcastle. The attendance was numerous, but the biddings were languid, and the prices obtained were comparatively low. We give a general statement of the results.

Seven shorthorned bulls, calved before the 1st of January, 1844, were sold for 172*l*. 15s., being an average of about 24*l*. 13s. each. Nine calved since that period were sold for 263*l*. 11s., averaging 29*l*. 5s. 9d. each. Three in each class were bought in. The highest price obtained in the first class was 37*l*. 16s., for a bull, three years and two months old, belonging to Lord Hastings, by whom it was bred. The lowest price was 20 guineas for a bull three years and two months old, belonging to Mr. Woodman, of East Acomb, near Newcastle. The highest price obtained in the second class was 56*l*. 14s. for a bull two years and 23 weeks old, belonging to Joseph Atkinson, of Embleton, near Alnwick; the lowest price 13 guineas for a bull one year and one month old, belonging to Deighton, of Winstow, near Darlington. Four short-horned cows, in milk, were sold for 121*l*. 10s., averaging 30*l*. 7s. 6d. each. One in-calf heifer was sold for 25 guineas, and another for 24 guineas. Four yearling heifers were sold for 84*l*., averaging 21*l*. each. A bull, of the Devon breed, belonging to Mr. Fullerton, of Theybury, was sold for 18*l*. 18*l*.

A cart stallion, belonging to Mr. Barthorpp, of Cretingham Rookery, near Woodbridge, Suffolk, six years old, was sold for 105*l*. One seven years old, belonging to Mr. Shanks, of Ityfred High Barns, near Cambridge, was sold for 85*l*. 15s.; and a two-year-old filly, belonging to Mr. Thomas Foster, of Jerainwood, was sold for 42*l*.

A Leicester shearling ram, belonging to Mr. Abraham, of Barnet-by-le-Wold, near Brigg, sold for 7 guineas; one 15 months old, belonging to Mr. Angas, of Keswick, brought the same sum. Mr. Grey, of Dilston, sold three shearling rams for 4 guineas, 8 guineas, and 9 guineas respectively, and two others at 7 guineas each. Two Leicester shearling ewes, one belonging to Mr. Angas, of Nesfield, the other to Mr. Maddison, of Wandon, brought 15 guineas each. The Southdown shearling rams varied from 5 guineas to 14 guineas. One belonging to Mr. Barclay, M.P., was knocked down to the Duke of Cleveland. The pens of Southdown shearling ewes belonging to Mr. Barclay, M.P., and Mr. Barnard, M.P., were sold at from 22 to 26 guineas.

Two boars, of a large breed, sold for 15 guineas and 3*l*. 5s. respectively, and three of a smaller breed for 5*l*. 5s., 6*l*., and 2*l*. 10s. A large sow, belonging to Mr. James, of Chalkside, near Wigton, sold for 5*l*. 14s., and five of a smaller breed for 23*l*. 1s. A pen of three breeding sows, belonging to his grace the Duke of Northumberland, sold for 11*l*. 17s.; and one eighteen weeks old, bred by Mr. White, of Lamesley, near Gateshead, sold for 2*l*. 15s.

A short horned heifer, two years and one month old, shown as extra stock, was sold for 19 guineas; and a harness mare, seven years old, belonging to Mr. Petrie, was sold to the Duke of Cleveland for 34*l* 13s.

Before the auction, the exhibiters of implements had received extensive orders from visitors to the show-yard, Mr. Crosskill alone having been entrusted with commissions to the amount of 1,000*l*.

Upwards of 1,500*l*. was taken at the principal entrance to the cattle and implement yard on Thursday, and the receipts of the week were upwards of 2,000*l*.—Times.

HYBRIDISED WHEAT.—We understand that Mr. Maund, who communicated to the council of the Royal Agricultural Society on the 8th inst. the specimens of hybridised wheat, has various other experiments in progress, he having been engaged in investigating this subject about three years, and is, we believe, the first botanist who has turned his attention to the improvement of wheat by hybridisation. It is at the present moment one of the most important subjects that can engage the attention of scientific men, and we hope that Mr. Maund, as the first to apply his favourite science so beneficially for the agriculturist, will be enabled to proceed and carry out what he seems so well to have begun. These experiments will be looked on with the more interest when it is recollected that for upwards of twenty years Mr. Maund has so ably conducted the "Botanic Garden and Fruitist," a work which has led the way and been chiefly instrumental in stimulating the public mind to its present zeal in the cultivation of fruits and flowers.

ROYAL, FARMERS' AND GENERAL, FIRE, LIFE, AND HAIL INSURANCE INSTITUTION.

REPORT OF PROCEEDINGS AT THE ANNUAL MEETING OF THE SHAREHOLDERS.

The annual meeting of the above Insurance Company was held at the Freemason's Tavern, on Wednesday, the 8th July.

On the motion of Mr. Hudson, of Castleacre, Norfolk, seconded by Mr. Blanch, Mr. George Parker Tuxford was called to the chair.

Mr. **George Parker Tuxford** having taken the chair, and opened the business of the meeting, stated that the first duty which devolved upon them was the election of an auditor: Mr. Pate, who had filled that situation for two years, was a candidate; the directors were well satisfied with, and had great confidence in that gentleman, who had always discharged his duty as an auditor to the Institution in a manner highly satisfactory to the directors generally.

Mr. S. **Boydell** said: The gentleman who is a candidate for the office of auditor, Mr. Pate, is a man of the strictest integrity and honour, and has always discharged his duty with credit to himself and satisfaction to your directors. I propose that Mr. Pate be re-elected (loud cheers).

Mr. **Smeddle** having seconded the motion, it was carried unanimously.

The **Chairman** then addressed the meeting as follows:—Gentlemen,—Having on former occasions directed your particular attention to those topics connected with the formation of the Royal Farmers' Insurance Institution, and having trespassed upon your patience with lengthened details of the parties engaged in its establishment, I am of opinion that on the present occasion it would be quite superfluous for me to recapitulate the names and merits of those gentlemen by whom to no inconsiderable extent it has been fostered, and through whose unremitting exertions it has been brought to that state of prosperity which I have the happiness of knowing it now enjoys. Sure I am that to many of my brother shareholders, whom I have the satisfaction of seeing around me to-day, it would appear quite unnecessary for me to dilate upon such subjects, as they are already so well known to them. I shall not, therefore, be induced to repeat even the substance of the past history of the Office, or anticipate the future by occupying your time with speculative opinions of my own, but, without further introduction to the business of the day, respectfully solicit your attention to the directors' report of the proceedings during the past year, and to the balance-sheet of the auditors, which will be now read and laid upon the table for your inspection by the Managing Director, and which I think you will agree with me in saying is the best evidence I can offer to your notice of our increasing business and growing prosperity. Before sitting down, however, I wish to state that I shall have great pleasure in listening to any observations which gentlemen present may be desirous of making, in connexion with the report and balance-sheet, when read, which I am sure Mr. Shaw will have as much satisfaction in answering.

The Managing Director having read the report,

Mr. **Brown** said: I rise to move that the report, together with the balance-sheet of the accounts of the Institution, be now received and adopted. It gives me great pleasure to see that the amount of business has so greatly increased. This must be very gratifying to all present; and I am sure that all who have heard the report read must be perfectly satisfied that we are progressing most favourably (cheers).

Mr. **Newman**, a county director, said: I feel highly pleased with the report which has been laid before the meeting; and I am desirous of embracing this opportunity to make a few remarks on the subject of Hailstorm Insurance. I live in the neighbourhood of Uxbridge, where many insurances have been effected in our office. I have constantly endeavoured to impress upon the minds of my neighbours the necessity of aiding each other by enforcing the advantages of insuring their stock, produce, &c. I remember a friend of mine who lost 200*l.* by a hailstorm. Now, I am not about to find fault with what the directors have done, but I regret that they have altered the rates of insurance, and more especially that they have increased those upon oats. The insurance against hailstorms is a new idea; every one insures against fire, and if you ask a man to insure against the calamities inflicted by hail, he will do so at once, provided the charges of insurance are moderate. I do wish the rates had not been raised; if they had not, you would have had many more insurers from my neighbourhood. I trust, however, we shall go on prospering; and, in conclusion, I beg to second the motion made by Mr. Brown.

Mr. **Napper**, in a lengthened address, in which he showed himself perfectly conversant with the principles and details of the business, said he had

had an opportunity afforded him by the Managing Director of looking through all the balance-sheets of the former years, in conjunction with the accountant, which he had gone through carefully, and found them perfectly correct (cheers); but there was one point, in the propriety of which he did not concur, namely, the raising the rate of interest to be paid to the shareholders. He thought it would have been more politic to have suffered the guarantee fund to accumulate, in the event of any unforeseen demands being made on the office. With the exception of the rate of interest proposed to be paid to the shareholders, he was perfectly satisfied.

Mr. NORTHOUSE, at some length, explained the principles upon which Insurance Offices might be considered to be soundly based as regards the rates of premiums, and capital; and vouched, of his own knowledge, that this Institution was established upon a sound and solid foundation.

Mr. SHAW, the Managing Director, rose and said, no circumstance could afford him so much gratification as that, after Mr. Napper had gone through the balance-sheets of previous years, he should be satisfied with the state of the accounts (cheers). As regards the rate of interest, he felt a confidence that the funds would be found amply sufficient to meet the engagements of the office. Had they called upon the shareholders for more money at the outset, they should not have been able to give a dividend of five per cent. (cheers.) A very large capital was frequently a great clog upon an institution. With respect to hail insurance, looking at the accounts as they now stood, they appeared to be getting a profit; but such is the want of experience in this branch of business, that he conceived it to be necessary to provide against any contingency that might occur. In 1843, there were hail-storms which destroyed a large portion of the crops in Norfolk, Suffolk, Essex, &c. Mr. Hudson, a gentleman now present, knows of losses in that year to the amount of 30,000*l.*; almost every farmer in those counties being a severe sufferer. What Mr. Newman had said on this subject would be borne in mind; and if, in course of time, it should be found that an alteration could be made in the premiums, the directors would be most willing to make any proper reduction.

Mr. HUDSON, of Castleacre, begged to offer a few observations upon the damage done some time since by hail, in his and the neighbouring counties. The damage was estimated at 33,000*l.*; and a subscription was raised of 10,000*l.*, which was formed into three classes. The first class was formed of those who had capital to fall back upon; the second, of those who had comparatively little; and the third, of those who had none—the working classes. I have (continued Mr. Hudson) received a letter from the Norwich Company, on the subject of the rates, and I cannot but give Mr. Tuxford every credit for the mode in which he conducted the negotiation with that office. I really think that the increase in our late rates, while it has improved our income, has enabled us to get rid of much liability. I suffered much from hail last year, and, as an insurer, I recovered a large portion of my loss; but some of my neighbours lost large sums—one, from 600*l.* to 700*l.* No longer ago than last Tuesday considerable damage was done in our neighbourhood, but I happily escaped. Oats and peas must suffer much from a hail-storm, and frequently the losses are almost incalculable; I think, therefore, that our rates are fully justified.

The CHAIRMAN: Before putting this motion, it devolves upon me to say a few words. I am much pleased with the gentleman for the mode in which he has moved the adoption of the report, and it is very satisfactory to me to have heard the observations which other gentlemen have made upon it. I feel, nevertheless, compelled to submit a few remarks in reply to Mr. Newman, who seconded it, inasmuch as he has dwelt upon the loss of several assurers in his own immediate neighbourhood owing to our increased rates for insurance against hail. Whatever may have been the effect of the addition to the rates of last year in some districts, the fact of the premiums already received in 1846, exceeding the amount to the same date in 1845, proves clearly that, to the present time at least, we have not lost ground through the increase which we have thought it prudential to adopt; particularly when it is borne in mind that our present premiums upon two hundred thousand acres of produce amount to as much as they did last year upon three hundred thousand acres, thereby relieving us altogether from one-third of the casualties of the season. When this society was founded there was no office in the empire competing with us in insurance against hail; but now the case is very different indeed. Still we can lay no claim to originality, as we find that similar institutions have long been in existence on the continent. So with regard to agricultural societies, long before the formation of the Royal Agricultural Society of England our Scottish neighbours were in advance of us in their pursuit of agriculture; for they had many years before established that flourishing Institution known as the Highland Agricultual Society of Scotland. I have already intimated to you that since we commenced insurance against hail, another society has been called into existence, having at its head the justly-esteemed Mr. Bignold, who has, for so many years, been distinguished as the able Manager of the Norwich Fire Office; I rejoice to say that, assisted by that gentleman and others, I was the humble means of securing an assimilation of rates with the Norwich Office, through which, I trust, the mutual prosperity of both societies will be advanced. It was not, however, until my third journey to Norwich that I succeeded in inducing the directors of that society to adopt our views upon this subject; when they expressed themselves satisfied with the result of our experience and the evidence produced, and further, that the alteration was imperatively necessary. I hope, therefore, that what has been advanced in reply to the remarks of Mr. Newman will prove satisfactory to that gentleman, and all present. In conclusion, I will only add, that with the observations of my friend Mr. Napper—if he will allow me so to call him—I am well pleased, as it is ever satisfactory to be supported by the independent testimony of others, who have voluntarily imposed upon themselves the trouble of examining the reports and balance-sheets presented to the annual meetings by the directors and auditors of this Institution. It now only remains for me to ask you whether this report and balance-sheet shall be adopted, or any gentleman has any further observations to make.

The motion, that the report and balance-sheet be received and adopted, having been put, was unanimously carried.

Mr. **Napper** again referred to the inexpediency of raising the rate of interest, and submitted the following motion—"Resolved: That, it having been proposed by the directors to raise the rate of interest on shares from 4*l.* to 5*l.* per cent., it is the opinion of this meeting that such a course is for the present inexpedient."

Mr. **Newman** seconded the motion, and observed that, as a shareholder, he should have been equally pleased had there been no interest given at all, but the money permitted to accumulate.

Mr. **Brown**, as a shareholder in the Institution, begged to offer a few remarks on the question before the meeting. As the business of the Office increased, and their means improved, it was a necessary consequence that the shareholders looked to a return for their investment: other offices were giving five and six per cent. At one period, no dividends whatever were paid by the society. This step he deemed advisable and correct; as the directors enjoyed the confidence of all present, he thought it better that the management should be left in their hands, and begged to move the following amendment—"Resolved: That the progress of this society is a great source of satisfaction. That the proposal of the directors to divide 5*l.* per cent. being the result of their deliberate consideration, this meeting approves thereof."

B. P. **Shearer**, Esq., said the shareholders must feel greatly indebted to Mr. Napper, for having looked over the accounts. As regards the increased rate of interest, all parties in his neighbourhood approved of it; therefore he begged to second Mr. Brown's amendment.

The **Chairman** having put the amendment, it was carried, with only two dissentients.

Mr. **Blanch** said the shareholders would remember that, at the meeting of the society held in 1844, a vote was passed to increase the salary of the Managing Director. He had ascertained lately that, in consequence of some arrangement in the deed of settlement, it could not be effected without a special meeting being called for that purpose. It must have been a source of regret to each of those who had voted on the occasion to find that the substance of the vote had not been carried out. He need say nothing in respect to Mr. Shaw's merits. His works were before the world. By his diligence and energy in carrying out the interests of the institution, he had won for himself the approbation of all who knew him. Mr. Blanch then proposed that a sum of money equal to what he would have received had the sum voted in 1844 been paid to him be awarded to Mr. Shaw.

Mr. **Napper** most cordially seconded the motion.

The **Chairman** again rose and said: The observations which have fallen from the gentleman on my left (Mr. Blanch) are such as evidently show that he has no desire that a collision should take place between the directors and the shareholders: but how stands the matter between the directors and Mr. Shaw? At the foundation of this institution Mr. Shaw agreed with the directors of the company to accept a certain amount of salary, with a subsequent increase in the shape of a per centage upon the premiums in the Life department of the Office, contingent upon those premiums amounting to so much per annum. Could anything have been more reasonably devised by the directors, or better calculated to operate as an incentive to energetic action on the part of the Manager than such an arrangement? Well, then; to carry out this arrangement in all its integrity, a clause was introduced by order of the directors into the deed of settlement, which bound alike Mr. Shaw and the company. You know there is no travelling out of a deed without danger to the parties pursuing such a course, and although the directors with whom I have the honour of most cordially co-operating have not carried out the resolution unanimously passed at the Annual Meeting of the Shareholders in 1844, it was not because we were indisposed to adopt it, or because we considered Mr. Shaw undeserving of it—far from it; but it was because an Annual Meeting of the shareholders did not possess the power to vote upon a subject of such importance as involved an alteration in the deed of settlement. No; such alteration could only be effected by a special general meeting, convened expressly for that purpose. Such meeting not having been called, I ask you, is it compatible with fair play that the directors should have had no notice whatever of this motion? I do not quarrel with the gentleman for moving this resolution, but I assert that we ought to have had an opportunity afforded us of informing him of the position we were placed in without having the subject brought before an Annual Meeting, when the preliminary steps might have been taken by the gentleman himself to carry out this object. I assure you most sincerely, there is no member of this society that would have more pleasure in making such a motion, if it were practicable, than myself; but I leave it to our Solicitors to inform you whether we have, at this meeting, the power of doing so. If Mr. Boydell, one of the company's Solicitors present, will say that I am in error, that we have the power at this meeting of complying with this resolution, which has been moved and seconded, I am sure no one present will oppose it (*cheers*).

Mr. **Brown** called the attention of the meeting to a circular sent to him from the society, and from which he learned that the increase in the business of the Office was very large. He contended that every servant was worthy of his hire; but there had been no increase in salary commensurate with that in the business of the office.

Chairman: None whatever.

Mr. **Brown**: When he looked at their present position, he was sure that the directors would unanimously agree to any vote that might be passed.

Mr. S. **Boydell** could not allow that opportunity to escape without adding his admiring testimony to the talents of Mr. Shaw. He (Mr. Boydell) trusted that the spirit of the resolution would be carried out.

Mr. **Charles Boydell** being called upon by the Chairman to give his opinion, stated that, having, in his character as solicitor, had frequent occasion of communicating with Mr. Shaw, he could bear testimony to his zeal and ability in conducting the business of the office. The spirit of the resolution could only be carried out by a special meeting. The deed of settlement distinctly stated that a special meeting was absolutely necessary.

Mr. **Blanch** then said, there appearing to be no difference of opinion on the subject, he would propose a resolution to the following effect—"That it is the unanimous opinion and wish of this meeting that the salary of the Managing Director should be increased from the time contemplated by the original resolution in 1844, and that the necessary steps should be taken by the directors for carrying this opinion and wish into effect."

Mr. **Napper** seconded the resolution; which, having been put by the Chairman, was carried unanimously, with applause.

Mr. **Shaw** said he could not but express his regret that so large a portion of their valuable time should have been occupied with so unworthy a subject as himself; but whether the resolution was carried into effect or not, he should not abate one iota of zeal and energy in devoting himself to the interests of the Institution (loud cheers).

Mr. **Blanch** then moved a vote of thanks to the directors; which, being seconded by several gentlemen, was carried unanimously.

Mr. **Hudson** begged, as one of the directors, to return thanks. That body had always given their best possible attention to the affairs of the society, and he himself had often travelled upwards of one hundred miles to be present at the meetings of the board.

Mr. **Yates** proposed a vote of thanks to the Chairman for his impartial and able conduct in the chair (cheers).

Mr. **Newman** seconded the motion.

The **Chairman**, in returning thanks, said, in rising to acknowledge the vote, he begged to state that the impression then left upon his mind by the kindness of all present would never be effaced from it. Should such a duty devolve upon him at any future period, he trusted he should receive the same cordial and good feeling then offered to him. He felt somewhat pained in being compelled to give the explanation he had done on the motion made with respect to Mr. Shaw; but it was in the faithful discharge of a public duty, which he owed to the shareholders at large, that he made those observations. He (the Chairman) was quite sure there was not one amongst them but who would "render unto Cæsar the things that are Cæsar's." Ever since he had had the honour to know Mr. Shaw he had felt great pleasure in being associated with him. He was, as most then present knew, one of the principal promoters of the Royal, Farmers' Insurance Company, the Royal Agricultural Society of England, and the father of Farmers' Clubs; which latter societies were, unquestionably, to be enrolled amongst the most valuable institutions in this country; and as such he declared that he was proud of the friendship of a man who had done so much to advance the interest of agriculture, who had laboured so assiduously to promote the happiness of all engaged, in its prosperity, the energies of whose life in fact were devoted to the cause of the tenant farmer, and the permanent improvement of his condition. Although his (the Chairman's) observations had been the means of protracting the meeting, he felt exceedingly obliged to all present for the warm and generous feeling evinced towards him.

Mr. **Brown** moved a vote of thanks to the assistant-manager, the secretary, and other officers of the institution: this having been seconded, the Assistant Manager returned thanks.

Mr. **Shaw** said, before the meeting broke up, he wished to make one observation. Mr. Napper had stated that upon examination of the balance-sheets he was perfectly satisfied with their correctness. All present were aware that the head of an office must experience great difficulty in answering for the correctness of the accounts unless he has under him those who are themselves accurate in their respective departments, although he is expected to bear the blame of the inaccuracies of others. He (Mr. S.) was much indebted to the exertions made by the Accountant to the Institution: and he begged to propose a vote of thanks to him for the excellent manner in which the accounts of the office were kept.

Mr. **Pate** seconded the motion; and the Accountant having briefly thanked the meeting for this mark of their approval of his exertions, the meeting broke up.

THE MALT TAX.

At the meeting of the Royal Agricultural Society held at Newcastle on the 16th July, Mr. Torr, of Riby, made the following remarks :—

"*I am quite certain that a new era is about to dawn on, I may say, the agricultural horizon, and that, in commercial principles, that labour which is the source of capital, shall have its just reward, and the labourer be able to assert his independence.* The labourers of England in my recollection have become much more independent in their station than they were formerly. I trust the independence of the tenant will be followed by that of the labourer."

The period of the application of free trade principles to agriculture may certainly be taken as "a new era" in the history of the agriculture of Great Britain. These principles may be said to be purely "commercial." If the government of this country is desirous of dealing out even-handed justice to the British farmers in the great change recently made, it must give them the advantages, as well as the disadvantages, which the system embraces. The manufacturers of woollen and cotton goods have continuously and successfully urged a reduction of the duty on the raw material; and the soundness of the principle is now so clearly established that it has been almost universally applied. In the history of taxation of the raw material there is no instance of a tax so oppressive in its character, so injurious in its effects, and rendered by recent legislation so unjust, as the Malt Tax. The "Total Repeal Malt Tax Association" some time since very judiciously offered a prize of twenty pounds for "the best essay on the evils resulting from the Malt Tax." There were numerous competitors for the prize, which has been awarded to one, the perusal of which will, we think, bring conviction home to the minds of those who may have doubted the propriety of advocating the repeal of that impost. The subject is considered in the prize essay in three points of view:—

1. The evils resulting to the farmers from the Malt tax.
2. The evils resulting to the labouring community.
3. The evils to the public at large.

Speaking of the evils resulting to the farmers, the writer says :—

"The principles of free trade having been carried out to a certain extent by the recent alteration of the duties on foreign corn, grain of foreign growth will be admitted duty-free, while barley, the growth of our own country, will be taxed, through the instrumentality of the malt duty; and hence, 'even-handed justice' will not be dealt out both to the home and to the foreign grower of barley. And how can this injustice be defended? But let us examine more closely into the various ways in which injustice is thus inflicted on the farmer of this country.

"There are three species of food containing properties calculated for the fattening of cattle, and which may be denominated farinaceous, oleaginous, and saccharine. The former consists of wheat, barley, oats, beans, peas, and maize or Indian corn; the oleaginous is chiefly confined to linseed cake: and the saccharine embraces mangold-wurzel, turnips, carrots, and parsnips. Now these are all of English growth, with the exception of maize and linseed cake, the former of which is admitted at the nominal duty of 1s. per quarter, and the latter quite free.

"Now, of these three fattening properties, the most stimulant are the oleaginous and saccharine, the former of the two chiefly imported, and the latter only to be obtained in the inferior state of mangold-wurzel, turnips, carrots, and parsnips. We say inferior; but to what? The answer is at hand—to barley! And why cannot the farmer avail himself of this article, seeing it is of his own growth, producible more or less in every soil? Again we have a ready reply—the malt tax!

Barley, in its simple ground state, has fattening qualities; but these are very poor when compared to those which may be brought into action by means of the malting process up to a certain point—that is, when steeped in water sufficiently long to cause the grain to germinate.

"The barley-growers of France, of Belgium, of Holland, and of Germany, not having the fear of the exciseman before their eyes, may steep their grain, bring out thus its fattening qualities, feed their cattle on it, and then bring these to the English market duty-free, to compete with the English farmer, who may stand by and see his own cattle superseded in his own market, merely because he cannot use the same means of fattening them as the foreigner. And why is all this? Because the malt tax interferes, and puts its veto upon his endeavours to compete with his opponent."

In answer to the position here taken, the Minister and the opponents of the repeal of the duty will quote the authority of the northern professors, as given in a recent Parliamentary report, to prove that the fattening properties of malt are not superior to barley. We joined issue upon that question at the time, we expressed our doubts of the practical knowledge of the learned professors for such an experiment, and we added our hope that some experienced farmer would devote his attention to the subject, and make such an experiment, or series of experiments, as might fairly test the correctness of the opinions entertained by practical farmers, who ought to understand the best modes of fattening an ox quite as well as a professor of chemistry, and who have again and again asserted the superior fattening qualities of malt. We are very much gratified in now being enabled to announce that an experiment has been made under such auspices and with such accuracy as to leave no doubt of its correctness, and that the result is most conclusive in favour of malt.

EXPERIMENT MADE BY JOHN HUDSON, OF CASTLEACRE, NORFOLK, OF FEEDING SIX HIGHLAND SCOTS; THREE FED WITH BARLEY-MEAL, AND THREE WITH MALT.

These six animals were selected from a lot of ten; two of the best were put into loose boxes, numbered A 1 and A 6: the two next best in like manner numbered B 2 and B 5: the remaining two, in like manner, C 3 and C 4. They were then weighed, and lots drawn which were to be fed on meal and which on malt. The lot fell on 1, 2, 3 for meal, and 4, 5, 6 for malt. They were all fed alike as regards other food, viz., they *all* had 1 bushel of mangel wurzel each per day, and the same quantity each of clover hay. No. 1, 2, 3 consumed one peck of barley meal each per day, and 4, 5, 6 one peck of malt each per day, from the 26th of March last to the 1st of July, when they were sent to London, and slaughtered by Mr. W. L. Curtis, of 25, Newgate-street. The followin is the result:

LIVE WEIGHTS, MARCH 26th, 1846.

	cwt.	qrs.	lbs.	
No. 1 ……	9	1	13	A
No. 2 ……	8	2	16	B
No. 3 ……	8	1	8	C
	26	1	8	
No. 4 ……	8	3	18	C
No. 5 ……	9	0	18	B
No. 6 ……	9	2	1	A
	27	2	9	
	26	1	8	
	1	1	1	

LIVE WEIGHTS, JUNE 29th, 1846.

	cwt.	qrs.	lbs.	
No. 1 ……	11	1	21	A
No. 2 ……	11	0	10	B
No. 3 ……	9	2	7	C
	32	0	10	
No. 4 ……	10	2	14	C
No. 5 ……	11	1	0	B
No. 6 ……	11	1	9	A
	33	0	23	
	32	0	10	
	1	0	13	

DEAD WEIGHTS.

No. 1.

	st.	5lbs.	£	s.	d.
4/4 Beef..	83	6¾..	13	19	2
Fat....	9	1½..	1	1	3
Hide ……….			1	2	0
Offal ……….			0	11	0
	s.	d.	16	13	5
Killing..	3	0	0	10	9
Commiss.	7	9			
			£16	2	8

No. 2.

	st.	lbs.			
4/4 Beef..	80	5¾..	12	15	7
Fat....	6	2½..	0	14	7
Hide ……….			1	2	0
Offal ……….			0	11	0
	s.	d.	15	3	2
Killing..	3	0	0	10	3
Commiss.	7	3			
			£14	12	11

No. 3.

	st.	lbs.			
4/4 Beef..	72	4¾..	12	1	8
Fat....	6	5½..	0	15	5
Hide ……….			0	18	6
Offal ……….			0	11	0
	s.	d.	14	6	7
Killing..	3	0	0	9	7
Commiss.	6	7			
			£13	17	0

No. 4.

	st.	lbs.	£	s.	d.
4/4 Beef..	78	3⅜..	14	7	4
Fat....	7	5½..	0	17	9
Hide ……….			1	0	0
Offal ……….			0	11	0
	s.	d.	16	16	1
Killing..	3	0	0	10	2
Commiss.	7	4			
			£16	5	11

No. 5.

	st.	lbs.			
4/4 Beef..	81	0⅜..	14	17	0
Fat....	7	0½..	0	16	4
Hide ……….			0	18	0
Offal ……….			0	11	0
	s.	d.	17	2	4
Killing..	3	0	0	10	4
Commiss.	7	4			
			£16	12	0

No. 6.

	st.	lbs.			
4/4 Beef..	86	3⅜..	15	16	8
Fat....	9	3½..	1	1	10
Hide ……….			0	18	0
Offal ……….			0	11	0
	s.	d.	18	7	6
Killing..	3	0	0	11	0
Commiss.	8	0			
			£17	16	6

NET PRODUCE.

	£	s.	d.
No. 1 ……..	16	2	8
No. 2 ……..	14	12	11
No. 3 ……..	13	17	0
	£44	12	7

	£	s.	d.
No. 4 ……..	16	5	11
No. 5 ……..	16	12	0
No. 6 ……..	17	16	5
	£50	14	5
	44	12	7
	£6	1	10

In favour of Malt.

Hence there is six pounds one shilling and tenpence, or something over two pounds per head, in favour of the animals fed upon malt. But this is not all. The carcass butcher who slaughtered the six animals writes to Mr. Hudson as follows :—" I beg to say the beasts 4, 5, and 6 were of a very much better quality than the others. The grain was finer, and altogether of a superior description, fully bearing out Mr. Collins's opinion with regard to the quality. In addition to which, the three beasts were purchased by one of her Majesty's purveyors, and selected from the others without any knowledge that there was anything more than ordinary about them. The price also confirms our opinion." Thus, then, the quality of the malt-fed beasts is marked not only by the improved quality, but by an increased price. We shall now conclude our remarks on the first division of the subject, namely, " The evils resulting to the farmer from the malt tax," by another extract from the essay itself.

" Whether we look at the injury the farmer receives by the indirect taxing of the raw material of barley, contrary to all the true maxims of taxation—whether we view the consequences arising from this fundamental error in the prevention of the use of barley for fattening his cattle—whether we consider how the inferior barleys are shut out from the malt market by the severe restrictions of the excise—whether we look at the hardship under which the farmer labours from being precluded from turning his barley into malt for his own and his labourers' consumption—in whatever way we view the question, we cannot fail to see that the malt tax inflicts a grievous, impolitic, and unjustifiable injury on the farmer; and that sound policy and 'even-handed justice' demand the '*total repeal of this obnoxious tax*.' "

REPEAL OF THE MALT TAX.

ESSAY FOR WHICH A PRIZE OF £20 HAS BEEN AWARDED BY THE " TOTAL REPEAL MALT TAX ASSOCIATION."

The Committee of the " Total Repeal Malt Tax Association," in putting forth their advertisement offering £20 for the best essay on the evils resulting from the malt tax, have—very judiciously for themselves, and very conveniently for the competitors for the premium—defined the particular points to which their arguments are to be confined; thus materially simplifying the task of the judges who may be appointed to decide, inasmuch as each essay being grounded on the same basis, their comparative merits may more easily be ascertained. Judging from the steps they are now taking, we may safely conclude that the members of the Association are zealous and sincere in their professed determination not to desist from agitating this question until it is finally set at rest by the repeal of the tax; and we may congratulate them on the propriety of the measures adopted to effect their purpose.

The experience of the last few years has taught the nation two important lessons :

First, " That any measure, if grounded on truth and justice, must ultimately be carried by means of that peaceful agitation, however great, which is based on the moral power of the people."

Second, " That such is the excellence of the British constitution, combining amazing strength with amazing elasticity, that, however great may be the pressure upon it, yet, when this pressure is once removed, its strength is found to have been unimpaired, and its elasticity still capable of restoring it to its original form and beauty."

If, then, we can show that the malt tax is *impolitic* and *unjust*, we may safely calculate on enlisting the moral strength of the people against its continuance; and so surely as we succeed in this, so surely may we reckon on the " total repeal of the malt tax."

In conformity with the foregoing observations, it will be our duty to endeavour to show that the opposition to the malt tax is founded on sound principles, agreeably to the propositions laid down by the committee, and which are as follow, viz.—

1st. The evils resulting to the farmer from the malt tax.

2nd. The evils resulting to the labouring community.

3rd. The evils resulting to the public at large.

And first, of the first—" The evils resulting to the farmer." All taxation, taken abstractedly, is an evil; but, since no good government can be maintained without taxes, it is necessary that these should be raised in the way most consonant to the general feelings of the people, and the least injurious to the interests of the trade and commerce of the country. No law, whatever be its nature, can long be maintained in a free community against the feelings of the people; nor will a commercial country long submit to any fiscal regulation when once seen to be in opposition to the best interests of trade and commerce.

It has long been a received maxim that the taxing the raw material is highly impolitic; that every encouragement should be given to the admission of such articles, so that the manufacturer directly, and the nation indirectly, may derive all the profit arising from the skill and labour bestowed upon it. This principle we have seen fully carried out, in the case both of cotton and wool, when in 1842 the last penny of importation duty was removed from each pound of the latter, and in 1845 the last farthing from that of the former. The same jealousy of taxing the raw material was shown as regards coals, the produce of our own country, as of that of foreign production; for, though in 1842 Sir Robert Peel put on a duty of 1s. per ton on all coals exported to foreign countries, such was the outcry raised against it, as interfering with the interests of the ship-owners and with the labour of the miners, that in less than two years it was abolished.

Some years ago there were severe prohibitory laws against the exportation of wool: these are now done away with, and thus importation and exportation are both equally free, and even-handed justice is dealt out both to the home and the foreign grower of wool.

The principles of free trade having been carried out to a certain extent by the recent alteration of the duties on foreign corn, grain of foreign growth will be admitted duty-free; while barley the growth of our own country will be taxed, through the instrumentality of the malt duty: and hence even-handed justice will not be dealt out both to the home and to the foreign grower of barley. And how can this injustice be defended? But let us examine more closely into the various ways in which injustice is thus inflicted on the farmer of this country.

There are three species of food containing properties calculated for the fattening of cattle, and which may be denominated farinaceous, oleaginous, and saccharine. The former consists of wheat, barley, oats, beans, peas, and maize or Indian corn; the oleaginous is chiefly confined to linseed cake; and the saccharine embraces mangold-wurzel, turnips, carrots, and parsnips. Now, these are all of English growth, with the exception of maize and linseed-cake, the former of which is admitted at the nominal duty of 1s. per quarter, and the latter quite free.

Now, of these three fattening properties, the most stimulant are the oleaginous and saccharine, the former of the two chiefly imported, and the latter only to be obtained in the inferior state of mangold-wurzel, turnips, carrots, and parsnips. We say inferior; but to what? The answer is at hand:—to barley! And why cannot the farmer avail himself of this article, seeing it is of his own growth, produceable more or less in every soil? Again we have a ready reply:—the malt tax! Barley, in its simple, ground state, has fattening qualities; but these are very poor when compared to those which may be brought into action by means of the malting process, which to a certain point, is allowed, that is so far as steeping it is concerned, but beyond this the process is prohibited, and therefore the privilege is useless.

The barley-growers of France, of Belgium, of Holland, and of Germany, not having the fear of the exciseman before their eyes, may steep their grain, bring out thus its fattening qualities, feed their cattle on it, and then bring these to the English market duty-free, to compete with the English farmer, who may stand by and see his own cattle superseded in his own market, merely because he cannot use the same means of fattening them as the foreigner. And why is all this? Because the malt tax interferes, and puts its veto upon his endeavours to compete with his opponent. The British farmer is not afraid to compete with the farmers of France, of Belgium, of Holland, and of Germany, if he has the same advantages; but, as the law will stand when the new tariff comes into operation, the blindness of justice will not have made her hold the balance even, but have caused her to put all the weights into the foreign scale, and leave the home one to kick the beam. It seems to me about the same thing as if two men were matched to run against each other, one having his legs tied, while the other has his at liberty.

In proportion to the goodness of the barley which the maltster uses is the quantity of saccharine he can produce from it; and in proportion to the saccharine is the value of the malt.

We have already said that all lands will produce barley, more or less in quantity, and we may here add, of different qualities. The barleys grown on the lighter soil—the gravelly, the sandy, and the chalky—are thin-skinned, and full of farina; while those of the stiffer are thick-skinned, and possess proportionately less flour. Of course, the maltster chooses the former, because, under the numerous restrictions to which his trade is subjected by the present law, he finds these not only more profitable, but he is, in some measure, prevented from using the latter. We are not pretending to argue that the best barleys will not, under the greatest freedom, make the best malt; but we do contend that the lower class of barleys might and would be much more used, were the restrictions above alluded to altogether removed. At present, the maltster not only has to pay a duty of 21s. 8d. per quarter on the malt he makes, but the law defines even the process of his manufacture, not leaving him the free exercise of his ingenuity in making improvements: he must wet his barley at a certain hour; he must let it lie in the cistern only a certain number of hours; he must keep it in the couch or bed so long; he must water it only with certain limitations: any deviation from these regulations being visited with heavy pecuniary penalties.

Now, owing to these stringent rules, only the best or thin-rinded barleys can be brought to work profitably within the time specified; but, were these restrictions removed, there is no doubt that the lower species of barleys, by having longer time allowed in the process, might be converted into a much better kind of malt than they can be at present. But at present, from the cause above-mentioned, they are pretty generally rejected altogether; and thus the maltster directly, and the farmer indirectly, are again injured by the malt-tax, with this difference between the two — the former, by the use of the superior barleys, can still carry on his trade, while the latter finds himself without any remedy; and the more he thinks upon the matter, and the more closely he examines into it, the more is he convinced that the great obstable to his prosperity is the malt tax.

Speaking of the check the tax is on the maltster, and hence the propriety of its removal, we may further observe that, owing to the duty on glass, there were some of the superior sorts which could not be manufactured in this country so as to compete with the French; and this was one argument used some years back for its abolition; to which was last year added the further reason for its repeal, that it would increase the amount of the manufacture, and, of course, the employment of the workmen engaged in it. And, if these arguments had weight as regarded the injury inflicted by the glass duty, with how much greater weight are they applicable to the injustice of the malt tax, seeing how much more numerous are the farmers than the glass manufacturers, the labourers of the former than the workmen of the latter!

Furthermore, we may observe that, previously to the increase of duty in 1780, there was a considerable trade carried on between some of the southern and western ports of England and Ireland by the exportation of malt from the former to the latter.

All taxes (and such are those of the excise) which interfere with the carrying on of any home trades or manufactures are bad in principle, and hence the policy of their abrogation. The reduction of all customs' duties as low as is consistent with the prosperity of our own manufactures and the raising of a revenue seems acknowledged by all statesmen as the true standard of policy in financial matters. Of late years, the repeal of taxes has had reference rather more to those of customs than those of excise. This does not appear to be quite fair. We do not quarrel with the repeal of customs' duties; we only crave that the repeal of excise duties shall go hand-in-hand with the former; in short, that the abolition of the malt duty shall follow as speedily as possible that of the corn duties.

There was a time when the farmer could send his quarter of barley to the maltster, and receive back a quarter of malt in return, the increase in making being considered sufficient payment for the manufacture; and, were the tax repealed, there is no reason why this custom should not again prevail. On examination or inquiry among those of a former generation, it will be found that malt-houses abounded in all parts of the kingdom; whereas now they are principally, if not entirely, confined to those districts in which the best barleys are produced, or these are purchased and conveyed to other places where they are not grown, for the purpose of being there malted. Thus in the London market almost all the malts are brought from one or other of the following counties, viz., Norfolk, Suffolk, Hertfordshire, Surrey, Dorsetshire, and the South Downs in Sussex.

Now, were the malt tax repealed, malt-houses would again spring up; the farmer who cultivates the stiffer soils would be able to use his barleys, either for the purpose of fattening his cattle, or, when made into malt, for brewing beer for his own family and his labourers. Thus would he derive considerable advantages; because, whatever he supplied to his workmen in the shape of beer, would have to be deducted from the amount paid in money wages; the labourers would be benefited by having the beer, and the farmer paying them in kind, instead of money, would receive great benefit, particularly the smaller one, inasmuch as, owing to the slow return of agricultural produce, his greatest difficulty lies in the want of capital: and it is by no means improbable that the situation of the farmers, generally speaking, has been deteriorated from the time when they ceased to keep labourers in their houses, as these were fed from the produce of the farm in food and beer, and little money was required for wages. Here, again, the malt tax crosses his path, and inflicts an additional injury on the farmer.

Whether we look at the injury the farmer receives by the indirect taxing of the raw material of barley, contrary to all the true maxims of taxation —whether we view the consequences arising from this fundamental error in the prevention of the use of barley for fattening his cattle—whether we consider how the inferior barleys are shut out from the malt market by the severe restrictions of the excise —whether we look at the hardship under which the farmer labours from being precluded from turning his barley into malt for his own and his labourers' consumption—in whatever way we view the question, we cannot fail to see that the malt tax inflicts a grievous, impolitic, and unjustifiable injury on the farmer, and that sound policy and even-handed justice demand the "*total repeal of this obnoxious tax.*"

Secondly.—The evils resulting to the labouring community from the malt tax.

Having endeavoured to show under the former head the evils arising from this tax as it affects the farmer, we may here observe that all these evils are more or less felt by the labourers at large, but more particularly by those engaged in agriculture. Where the tax interferes so as to lessen the cultivation of barley and its application to the fattening of cattle, the farmer is the greatest sufferer; but where it operates so as to deprive the labourer of his beer, then the latter has most reason to complain: for, although the price of this favourite beverage being raised by the tax tends to increase the expences of the farmer, still it only affects him pecuniarily, and not physically, seeing that he is not altogether precluded from the use of this nutritious beverage; whereas the labourer, being affected in a pecuniary way, is also affected in a physical one; for, unfortunately, no sooner do you touch the labourer's pocket, than his stomach is sure to suffer in unison with it. Those who are unacquainted with the internal management of the poor man's small means of existence can form but a very slight notion of the injury inflicted on him by the least rise in the price of any of the common necessaries of life. Hence it becomes the bounden duty of government to adopt all such measures as may tend to keep the general articles of food in use among the people at the lowest price consistent with remuneration. And to insure this desirable end, all extraneous increase must be removed: and what is more extraneous than a tax on this food? What is a more essential article of food than beer? And what can tend so much to raise the price of this—*the people's beverage*—as the malt tax? And what demand can justice and policy more imperiously make than the "*total repeal of the duty on malt?*"

Among the many beneficent dispensations of Providence, we cannot fail to observe how wisely it has been ordained that different climates should produce different kinds of food, each peculiarly adapted to the physical wants of their respective inhabitants. Thus, the natives of the East Indies have their rice; of the West Indies their yams and their cocoa-nuts; of the South of Europe their grapes, their olives, and their figs; and of the more northern nations their wheat, their barley, and other farinaceous products. Now, to tax these articles, forming the staple of the people's food in their respective countries, has ever been considered unwise, most unjust, flying, as it were, in the face of heaven, interposing between the Great Giver of all good things and their intended recipients, and dashing from the lips of a famished people the cup which a kind Providence had prepared for them.

Mark with what indignation the poet exclaims against those who some years ago obtained a monopoly of rice in Hindostan, and saw the people starve, rather than unlock their store before it rose to a famine price:—

"Rich in the gems of India's gaudy zone,
And plunder pil'd from kingdoms not their own—
Degenerate trade! thy minions could despise
The heart-born anguish of a thousand cries—
Could lock, with impious hands, their teeming store,
While famished nations died along the shore!—
Could mock the groans of fellow-men, and bear
The curse of kingdoms peopled with despair—
Could stamp disgrace on man's polluted name,
And barter with their gold eternal shame!"
Campbell's Pleasures of Hope.

The gabelle, or salt tax, affecting this great necessary of life, and which pressed so heavily on the French under the old *regime*, was one of the incipient causes of the revolution in their country. The present octroi tax in France, which is a duty levied on wine, &c., the produce of the country, when conveyed from one province or from one town to another, is considered by more enlightened financiers to be a most absurd tax, being based on the false principle we have been alluding to. The malt tax, resting on an equally unstable foundation, must fall.

It has been argued by some, that the farmers' objection against the malt tax was not altogether valid, so long as the duty on the importation of corn continued, but that being taken away, every day that the malt tax remains, the statute book will be the record of a gross act of injustice both to the farmer and the labourer of Great Britain, and more particularly to the latter. But let us descend to particulars, and see more minutely how this tax has operated to the injury of the labouring community.

The first tax was laid upon malt in 1697, and the following are the various alterations it has undergone, viz.—

In 1697	the duty per quarter was	£0	4	0
„ 1760	„ „ „	0	6	0
„ 1780	„ „ „	0	10	10
„ 1791	„ „ „	0	12	10
„ 1793	„ „ „	0	10	10
„ 1802	„ „ „	0	19	4
„ 1803	„ „ „	1	15	10
„ 1816	„ „ „	0	19	4
„ 1819	„ „ „	1	8	10
„ 1822	„ „ „	1	0	8
„ 1840	five per cent. laid on „	1	1	8

The following tables are intended to show the operation of the tax on consumption:—

Year.	Population.	Bushels of Malt made.	Duty per bushel.		Consumption per head.	
			s.	d.	bush.	gal.
1730	5,687,993	28,410,421	0	6	5	0
1740	5,829,705	22,074,674	0	6	barely 4	0
1750	6,039,684	29,284,786	0	6	5	0
1760	6,479,730	27,810,971	0	9	4	2⅓
1770	7,227,586	24,452,960	0	9	3	4
1780	7,814,827	30,805,100	1	4¼	4	0
1790	8,540,738	21,976,959	1	4¼	2	4½
1801	8,872,980	30,338,376	2	5	3	3
1803	9,132,980	29,562,038	4	5¾	3	2
1805	9,392,980	21,665,204	2	5	2	2½
1811	10,150,615	25,982,749	0	0	2	4
1813	10,550,615	21,701,356	0	0	2	0
1821	11,978,875	26,138,437	3	7¼	2	1½
1828	13,249,508	30,517,819	2	7	2	2
1829	13,431,027	23,428,135	0	0	1	6
1831	13,897,187	32,963,470	0	0	2	2¾
1837	15,097,187	33,692,356	0	0	2	2
1841	15,906,829	30,956,394	5 per cent. added.		1	7½
1844	16,511,725	31,856,551	0	0	1	7½
1845	16,711,725	30,508,840	0	0	1	6⅔

These tables are calculated for England and Wales alone. The population down to 1790 is taken from "Wade's British History," and hence from the parliamentary census, the intermediate years being reckoned at an increase of 200,000 annually. The malt tax is taken from "The Penny Cyclopædia," and the amount of consumption from the same work down to 1790; and after this time, with the exception of that of 1801, from the parliamentary returns.

On examining the last table, the following observations cannot fail to suggest themselves. The average consumption of each individual for the four first periods of ten years each, while the duty was only sixpence per bushel (for, though raised in 1760 to ninepence, it could scarcely be felt in this year), was four bushels 4½ gallons; whereas, in the next twenty years to 1780, it was only 3 bushels 6 gallons, being a decrease of 6½ gallons, or more than 16 per cent. From 1780 to 1790, the duty having been increased to 1s. 4¼d. per bush., the average fell to 2 bushels 4½ gallons per head; that is, it decreased one-third, or 33 per cent. In the next eleven years, probably owing to the war, which commenced in 1793, the consumption increased to 3 bushels 3 gallons—nearly to what it had been in 1780. But from the time that the duty was raised in 1803 to 4s. 5¾d. per bushel, although it underwent subsequently several modifications, there has been a general tendency to a decline in the consumption of malt; so that the average from this latter year to 1845, both inclusive, is only 2 bushels 1¾ gallons, while that from 1730 to 1801 is as high as 4 bushels, or nearly double.

Down to the year 1829 there was a duty on beer of five shillings per barrel; and we find the consumption as low as 1 bushel 6 gallons per head; but this tax having been in that year repealed, we find an impetus was given at once to consumption, the average of 1831 and 1837 being 2 bushels 2 gallons, showing an increase of half a bushel per head, or about thirty per cent. In 1840 five per cent. was added to the malt tax, and the consumption fell to 1 bushel 7 gallons—the average from that time to this. It may seem scarcely justifiable to ascribe so great a decrease of consumption to so seemingly trifling an increase of duty; but as it is the last straw that breaks the camel's back, so this increase of duty so far decreased the consumption as to be sufficient to show that taxation had previously reached its maximum as regards malt, and that the least rise or fall would make the scale preponderate for or against the consumer, according to which was placed therein.

In speaking of this slight alteration producing such great results, it must be borne in mind that partly in consequence of the great increase of duty on malt in 1803, and partly from the immense rise in the price of barley, malt became so excessively dear as to put it out of the power of the labourer to purchase it for the purpose of brewing at home; and hence, when he wished to indulge himself with a draught of his favourite liquor, he was compelled to resort to the alehouse to obtain it. The former practice ceased, and the latter took its place; and the present generation are ignorant of the custom of brewing their own beer, so prevalent among their ancestors.

And now let us see how this change operates to the injury of the labouring community. The average price of barley for several weeks past has been about 30s.; but, as inferior samples are included, which are not used for malting, we shall assume 32s. per quarter to be the price:

	£	s.	d.	
Barley, per quarter .	1	12	0	
Malt duty, per do. .	1	1	8	or 66 per cent.
Price to maltster . .	2	13	8	
Profit at 10 per cent.	0	5	4	or 16½ per cent.
Price to brewer . .	2	19	0	
Profit at 10 per cent.	0	6	0	or 18 per cent.
Price to publican .	3	5	0	
Profit at 10 per cent.	0	6	6	or 20 per cent.
Price to consumer .	3	11	6	or 120½ per cent. on the qr. of barley.

Thus does the labourer pay 120½ per cent. more than the original cost of the barley, owing to the malt tax; or, in other words, supposing the tax were repealed, the price of barley 32s. per qr., and the increase sufficient to pay the maltster's expenses of manufacture, then the consumer would buy malt at 4s. 6d. per bushel (allowing 10 per cent. profit to the maltster, and rather more,) instead of 8s. per bushel—the present price; and thus would he save in this way nearly half; that is to say, the duty compels him to pay almost cent. per cent. more for his malt than he would without it.

Taking this statement as correct, then every man who drinks a quart of porter or beer at 4d. per quart pays rather more than 2d. for tax; but, as porter or beer of the same quality sells at 3½d. in London which costs the consumer 4d. in the country, we will take the medium of 2d., which will be quite within the mark, and then it results that every man who consumes one quart of beer daily, of the quality here specified, must pay annually, by way of tax, not less than three pounds and tenpence, or one shilling and twopence per week.

The following table will show the amount of duty paid at different periods by the labourer individually, and also by his family, estimating the latter at five persons:—

Year.	Consumption per head.		Tax per bushels.		Tax per head.		Tax per Family.		
	bush.	gal.	s.	d.	s.	d.	£	s.	d.
1730 to 1760	4	4½	0	6	2	3	0	11	3
1760 to 1780	3	6	0	9	2	10	0	14	2
1780 to 1801	3	0½	1	4¼	4	0	1	0	0
1803 to 1805	2	6	4	5¾	12	4	3	1	8

We shall not carry this calculation any further, as we consider the labourer now ceased to brew, and henceforth his consumption took place in the shape of beer at the alehouse, increasing the tax on him as already stated. But this table will show how cruelly the tax oppressed the labourer; for though he gradually lessened his consumption, the former still increased upon him, until, no longer able to bear up under the load, he abandoned his home-brewed beer in despair.

Let us apply one more test before we leave this part of our subject, for should we be able to show that we are writing in the cause of suffering humanity, we may safely calculate on enlisting in our cause all the best feelings, and, consequently, the most zealous assistance of all our fellow-countrymen:—

In 1775 wages per week were .	7s. 0d.
„ malt per bushel . .	2 6

The labourer could earn per week nearly 3 bushels.

In 1845 wages are per week .	12s. 0d.
„ malt per bushel . .	8 0

The labourer can earn per week only 1½ bushels.

	£	s.	d.
In 1775 wages were per year .	£18	4	0
„ 4 bushels of malt cost the labourer .	0	10	0
In 1845 wages per year .	31	4	0
„ 4 bushels of malt cost the labourer .	1	12	0

In the former year this sack of malt only required one shilling out of every thirty-six to enable the labourer to purchase it, while in the latter it required one in twenty, or nearly double.

In 1775 the duty of 6d. per bushel on his 4 bushels of malt would take only two-fifths of one week's wages to pay it; whereas in 1845 the duty of 2s. 8½d. per bushel required almost the whole of one week's wages.

	s.	d.
In 1775 wages per week . .	7s.	0d.
„ duty on 4 bushels of malt at 6d. per bushel . .	2	0
In 1845 wages per week . .	12	0
„ duty on 4 bushels of malt at 2s. 8½d. per bushel .	10	10

But not to weary the reader with further statistical details, enough, we trust, have been adduced, whether we take the whole or any one of the tests here applied to elucidate this fact, this undeniable fact—that the consumption of malt has considerably fallen off: and further—that this decrease of consumption has progressed side by side with the increase in the duty on malt. How then can we fail to come to the conclusion that the latter has been, in a great measure, the parent of the former?

It is an acknowledged fact among all historical writers, that nothing is so slow of change as the habits of the great mass of the people of any nation, whether these relate to their language, to their mode of thinking and acting, to their clothing, or to their food.

Tacitus, a Roman historian, who flourished in the first century of the Christian era, informs us that the Germans were at that time particularly fond of beer; and this remark is applicable to their descendants at this day; while not only these, but all those people who have sprung from the great Scandinavian stock are equally noted for their love of this beverage. It is well known, also, that our Saxon ancestors were inveterate drinkers of beer; and this taste is not, as some suppose, changed or eradicated, but only lies dormant, as it were, from the want of means to indulge it. Every man now living, who can number sixty years as having passed over his head, can well remember how, when formerly farm labourers were kept in the farm-house, beer constituted their beverage at breakfast, dinner, and supper—not to mention the bottle, which was filled with it, to take to the field or the barn. He also cannot have forgotten how universal were the harvest suppers, and how good strong ale, brewed six or twelve months before, for the special celebration of this rural feast, always constituted the only liquor used on the occasion.

Some will argue that the tastes of the labourers are altogether altered, and that tea and coffee having come into use, beer has been superseded. Considering that this argument is carried too far when used to prove that the taste for beer is entirely lost, we shall not fall into the opposite error of attempting to prove that the abolition of the malt-tax, however low it might reduce the price of beer, would be the means of causing it in return *entirely* to supersede the use of tea and coffee. We are too well aware of the truth of the saying, "He who proves too much proves nothing," to venture on so dangerous a course; lest, like Hudibras, who, in vaulting too high in trying to mount his horse, instead of alighting on the centre of his saddle, fell over on the opposite side, we might find ourselves in the same unfortunate predicament. But though we thus refrain from arguing that beer, when freed from all duty, would become the labourer's beverage at his morning and evening meal, still we have no hesitation in affirming it would form his drink at dinner, and always accompany him to the field, and support him during his labours there or elsewhere.

Under the altered circumstances arising out of the abolition of the tax, there can be little doubt but the farmer would find it to his interest, as well as to that of his labourers, to supply them with good wholesome beer for their daily consumption; and many of the latter, in the course of time, might brew a little for themselves, as some few do even now, so that on a summer evening, in front of their cottages, and on a winter night, by their own fireside, they might enjoy their pipes and their home-brewed beer.

Let us hear what the labourers themselves say. Before a committee of the House of Commons, a few years ago, a labourer, of ninety years of age, stated that when he was young every man had his own beer; and, on being asked if he could do more work with than without beer, replied, he could do double the quantity; while a younger labourer stated that for want of beer he frequently felt weak and faint.

Perhaps it may be objected here, that all these arguments apply only to the agricultural labourers. We plead guilty in part to this charge; because the farmers, being the growers of barley, will be the most benefited by the change, while their labourers will most largely participate with them. Farm labourers living in the country—many in secluded parts, far away from towns, and, in some cases, from villages, not having the convenience, nor perhaps desirable that they should, of the public-house close at hand—stand more in need of the change. But it must not be supposed that this class of labourers will alone be benefited; every class, whether living in town or country, will receive great advantage from the repeal of the malt-tax, whether they may be supplied with beer by their employers, whether they brew for themselves, or whether they send to the inn for it, to drink at their own houses. However, if even the benefits were more exclusively confined to the agricultural labourers than they will be, still there is no reason, seeing how numerous these are, why they should be deprived of so great an advantage because others are not equally participators in it. But we contend that all classes will be benefited; the truth of which we hope to show more clearly under the next and last head of our essay, viz.:—

Thirdly.—The evils resulting from the malt-tax to the public at large.

The habits prevalent among the inhabitants of towns will always differ from those of the country: the latter are isolated, and thus more dependent on their own resources; these must be, in a great measure, their own bakers and their own brewers: while, without stopping to consider the relative value of home-baked bread and home-brewed beer, as compared with the same articles when supplied by the baker and the brewer, the convenience is so great, the town's-people generally will purchase their bread of the public baker, and their beer either of the public brewer or of the publican, but most frequently of the latter. These remarks apply not only to the mere labourer, but equally to the mechanic, the artizan, the smaller class of tradesmen, and persons in general of small independent incomes, dwelling in towns.

Seeing that all these classes are pretty generally purchasers and not brewers of beer, let us endeavour to ascertain what is the reduction in the price of beer which may be fairly calculated on when the *total repeal of the malt tax* shall have been effected.

	£	s.	d.
Average price of barley per qr.	1	12	0
Present duty on ditto when malted	1	1	8
	2	13	8
Add maltster's profit at 10 per cent	0	5	4
	£2	19	0

From this quarter of malt the London brewers manufacture a certain quantity of good common porter or beer, of the same quality which they can sell to the publican at £1 13s. per brl., and the publican retail at 4d. per quart.

Let us compare this with the price which may be expected when the duty is repealed:—

	£	s.	d.
Barley per qr.	1	12	0
Maltster's profit at 10 per cent	0	3	0
	£1	15	0

From this quarter of malt the same brewers could manufacture porter and beer as follows, viz.:—Porter and beer of the same quality as before-mentioned, at £1 4s. per brl.; the publican could retail ditto at 3d. per quart.

These beers are stronger than people in general like to drink at their meals; but an article quite as strong as the highest of the middle classes would desire for this purpose might be sold by the brewer to publicans at 18s. per brl., and retailed to the public at 2d. per quart.

A good, wholesome table-beer, such as the great majority of people would take at dinner, might be sold by brewers at 12s. per barrel, which is only 4d. per gallon.

A still smaller, but not unpalatable beverage, calculated for the poorer classes of all, might be brewed by brewers at 8s. per barrel, to be purchased for home consumption at 2s. per firkin of 9 gallons, costing him less than 3d. per gallon.

These are the advantages which would result to the public at large; for though these last statements are made to show more particularly how they would apply to the inhabitants of towns, yet as many families of different classes (including many agricultural labourers and other inhabitants of the rural districts in the vicinity of towns) would be purchasers, not brewers of beer, they apply equally to them; and whether the people at large brewed at home or bought their beer, proportionate advantages would be felt, and all alike would be participators in this great good—and a great good it certainly would be—for who can say but that the morals of the people will be improved in proportion as they may become beer-drinkers instead of dram-drinkers? it being well known that the effects of drinking beer to excess are narcotic, whilst those of dram-drinking are maddening and infuriating. It is also a fact that there has been a necessity, of late years, of lowering the standard height for army recruits, showing a physical degeneracy in the present generation: and who can say but this may proceed from the inability of procuring beer at a moderate price, increased by the consequent indulgence in spirituous liquors?

From 1730 to 1760 the people seem to have been in the full enjoyment of their natural, and therefore favourite and wholesome beverage—beer, when the consumption of malt averaged 4½ bushels per head; and had the consumption kept pace with population, instead of the former having been in 1845 only 30,508,840 bushels, it would have risen to 75,202,862 bushels; but, owing to the high duty on malt, it was impossible to bring the inferior barleys into use; and as the growth of the best could not be made to keep pace with the population, a sufficiency could not be found for all the people, many became stinted in their allowance, if we may so say, and others were compelled to forego their indulgence in beer altogether. And thus it was that tea, and coffee, and cocoa, and even Hunt's roasted corn, were severally placed on the labourer's table, not only at breakfast and supper, but too frequently also at dinner; and hence, as before observed, it is contended that the former of these articles (tea and coffee) are now become such complete substitutes for beer, that no alteration in the malt tax can displace them. To this argument we have already replied; and we only here allude to it again for the purpose of observing that we do not quarrel with tea and coffee, but that, as a considerable reduction has been already made in the duty on coffee, and people are beginning to discuss the propriety, not to say the necessity of lowering that on tea, we must protest against the justice, not of lessening the tax on either of these articles, but of lessening them and still allowing the tax on malt to continue.

Without wishing to stretch our arguments further than they will bear, we may safely assert, if these have any soundness in them, that sufficient has been shown to prove the propriety, the justice, and the policy of repealing the malt tax. There can be no doubt that by so doing the physical condition of the great mass of the people will be greatly improved: if their physical condition be good, contentment is the result; and if they are content, all is well, firm, and stable in a nation. The people form the basis of the great social column; and if this be sound, the shaft will retain its perpendicular, and the capital exhibit all its richness to perfection.

With good grounds of hope to see these happy results produced by the abolition of this duty, we do think "The Total Repeal Malt Tax Association" is well deserving of the support of public opinion; and knowing that the power of the people, if based on moral grounds—as we trust we have shown is the case in this matter—cannot fail of eventual success, we would earnestly call upon every one to assist, as far as lies in his power, in bringing about so desirable a consummation as the "total repeal of this obnoxious tax."

REPLY TO MR. J. B. LAWES'S OBSERVATIONS ON MR. NESBIT'S PAMPHLET ON HOPS.

Sir,—Some opinions on my pamphlet, from the pen of Mr. B. Lawes, require some observations from me, to place those opinions in a proper light. My professional occupations have not allowed, until now, the opportunity of noticing them. I should certainly have expected from a scientific man like Mr. Lawes some reasons for his opinions; whereas he seems to have dived at once into the matter, and, as a new convert usually does, at once condemns the views of others because he happens to have changed his own.

Into the great and broad discussion of whether the views of Liebig or of Boussingault be right—whether the inorganic or organic elements are the more necessary, I shall not presume at present to enter, because I have great reason to believe them *both* to be necessary. But I shall certainly endeavour to show Mr. Lawes that, whatever his *opinion* may be, potash for the hop plant is a thing of *paramount* importance. I must first be allowed to correct Mr. Lawes in a point where he seems to have misunderstood me. Mr. Lawes says, "In the ash of the hop Mr. Nesbit found more potash than any other substance, and from this he concludes that *manures* are valuable in proportion to the amount of potash they contain." Mr. L. has here attributed to me that which is not to be found in my pamphlet. I do not say that manures are valuable in proportion to their potash. I say in my pamphlet that which I still believe to be the fact, that the great amount of potash removed *year by year* from the land by a crop of hops, is the main reason, though it may not be the only reason, why the hop requires to be so highly manured.

So far as can be gathered from the letter of Mr. Lawes, that gentleman means to assert that the application of inorganic matters to plants *without ammonia* is useless; for he says, speaking of a manure recommended by me for hops, "with the exception of the small quantity of organic matter in the guano, this manure is composed solely of mineral ingredients, and would be almost useless." 2ndly. That the application of ammoniacal compounds *without* inorganic matter will be attended with benefit to the farmer, for he observes, "I am sure you can follow no safer rule in selecting manures for that plant than to buy those which contain the largest amount of ammonia at the least price." I think there will be no difficulty to prove, from the experience of agriculturists, that both these views and assertions are erroneous. If, according to Mr. Lawes's theory, the use of mineral ingredients without ammonia be useless, what becomes of the observations of agriculturists on the benefits derived from the application of gypsum, peat ashes, wood ashes, salt, marl, lime, and, among a host of mineral manures, of *his own* super-phosphate of lime. Everybody knows the benefit which hops in various districts derive from the application of mineral matters, from *lime, peat ashes, wood ashes*, &c., the two latter of which contain potash. But in addition to the authority of actual experience of practical men, I will adduce the observations of Boussingault himself. He says, "wood ashes contribute to improve the soil." Again, "It is impossible to doubt that salts, having *potash* and soda for their base, are useful in agriculture. The influence of wood ashes, and of paring and burning, is unquestionable; and they are so, in consequence of the salts of their bases (potash and soda) which they employ, and which always enter into the constitution of vegetables. There are even certain *crops*, which, in order to thrive, require a *particular alkali*; the vine, for example, the fruit of which contains bitarturate of *potash*; and sorrel, which contains binoxalate of potash, *must needs have supplies of potash*." The case of clover, selected by Mr. Lawes as a proof of the inutility of potash, is one of the most unfortunate for his argument that can well be imagined. Mr. Lawes says, "If a farmer were asked which crop he considered the least exhausting to the soil, he would probably say clover; and yet this plant removes a far larger quantity of potash from the soil than the hop." Every practical man knows that clover is one of the *most exhausting*, though one of the most nourishing of his crops, and that it is almost impossible either to grow it year after year, or even once every four or five years. Whence arises this difficulty of growing clover year after year? Doubtless it arises in the main from the great quantity of potash abstracted from the soil by this plant. Boussingault himself ascribes the failure of clover to this very cause. He says, "a crop which abstracts from the ground a notable proportion of one of its mineral elements should not be repeatedly introduced in the course of a rotation which depends on a given dose of manure, unless by the effect of time the mineral element has been accumulated in the land. A *clover* crop takes up, for example, 77lbs. of alkali per acre. If the fodder is consumed on the spot, the greater portion of the potash and soda will return to the manure after passing through the cattle, and the land will eventually recover nearly the whole of the alkali. It will be quite otherwise if the *fodder is taken to market*; and it is to these repeated exportations of the produce of artificial meadows that the failure of clover, now observed in soils which have long yielded abundantly, is undoubtedly due." Now, if it be difficult to grow clover even once in four or five years, or two years together, how much more difficult is it to grow hops for twenty or thirty years on the same soil, removing every year from that soil on an average between 50lbs. and 70lbs. of potash per acre? But Mr. Lawes says, after a clover crop has been taken away you can get a better crop of wheat. Without doubt, but this does not prove that clover is not an exhausting crop. What if these crops take out wholly different proportions of mineral elements, as in fact they do. And this surely has some little to do with the affair.

	lbs.
Clover removes of potash	77
Wheat removes of potash	24
Clover removes of potash more than wheat	53
Clover removes of silica	15
Wheat removes of silica	121
Wheat removes of silica more than clover	106

Mr. Lawes says in one part of his letter, "As far as my experience goes, I have never been able to find any distinct benefit from the application of potash to the soil in any form whatever, and the same result has been arrived at, indirectly, by agriculturists." With respect to the first part of the assertion, I have nothing to offer; but with the latter, I differ *in toto*. So far from agriculturists finding that potash was no good, they have found it perfectly the reverse. All good farm-yard dung contains potash; likewise rape-cake, oil-cake, wood, and peat-ashes, &c.; and whatever Mr. Lawes may say to the contrary, the nitrates of potash and soda do act powerfully, from the potash and soda they contain. But experiments made with the silicate of potash have shown this salt to be a powerful manure; and as experiments are better than assertions, I must refer Mr. Lawes to some of the former. The following table is taken from Johnston's "Agricultural Chemistry," appendix, page 63.

Results of experiments with different saline substances, mixed with farm-yard dung at the time of planting, in growing early American potatoes. Planted 29th April, and lifted 31st August, 1842. The quantity of land in each plot was one-eighth of an imperial acre.

No.	Description of Manure and Salts.	Quantity applied.	Produce per acre.		
			tns.	cwt.	qrs.
1	Farm-yard dung alone	35 cubic yards	8	17	2
2	Common salt added to dung	2 cwt.	8	15	0
3	Nitrate of soda, do.	1½ cwt.	12	7	2
4	Sulphate of magnesia, do.........	2 cwt.	11	7	2
5	Sulphate of ammonia, do.	1½ cwt.	13	7	2
6	Sulphate of soda do.	2 cwt.	8	0	0
7	Silicate of potash, do.	1 cwt.	15	0	0

Among the remarks appended to the table, we find the following:—"No. 7 (silicate of potash) was remarkable for intenseness of colour and length of stem, so much so that it appeared a different kind of potato."

Dr. Muspratt likewise informs me that an application of lime and subsilicate of soda had a decided effect upon the straw of wheat, causing it to grow exceedingly strong.

Liebig also relates a remarkable instance of the effects of depriving a soil of its potash. "In the vicinity of Gottingen (says he), a proprietor of land, in order to obtain potash, planted his whole land with wormwood, the ashes of which are well known to contain a large portion of the carbonate of potash. The consequence was, that he rendered his land quite incapable of bearing grain for many years, in consequence of having entirely deprived the soil of its potash."

These experiments and observations are quite sufficient to prove that potash does exercise a considerable effect on soils, and on the crops growing on them. Thus much for the uselessness of the mineral ingredients.

And now I must address a few observations on the "safe rule" of selecting for the hop those manures only which furnish the most ammonia at the least price.

Of the necessity and utility of ammonia (nitrogen) to plants there can be no doubt, and it must be furnished by some means or another to the vegetable world. But when manures are recommended solely because of their ammonia, it is necessary at once to point out to the intelligent farmer the fallacy of such a recommendation.

The scientific and the practical farmer have in view one common end—firstly, to get the soil into a state of fertility; and secondly, by replacing the substances taken by the crops from the soil, to retain that state of fertility. Ammoniacal manures are useful because they contain nitrogen. If you apply nitrogen alone while your plants are taking from the soil a dozen other things, which you are not replacing, though you may for a year or twenty years get a better crop, you are impoverishing your land. Your are, by the help of the ammonia, taking out more than you put in; and, as Poor Richard says, "Always taking from the meal tub, and never putting in, soon comes to the bottom."

Liebig mentions an instance of the use of these highly nitrogenous manures, which bears so nearly on this subject that I shall give it entire. He says—"The most decisive proof of strong manure was obtained at Bingen (a town on the Rhine), where the produce and development of vines were highly increased by manuring them with such nitrogenous manures as the shavings of horn, &c.; but after some years the formation of the wood and leaves decreased, to the great loss of the possessor, to such a degree that he has long had cause to regret his departure from the usual methods. By the manure employed by him, the vines had been too much hastened in their growth; in two or three years they had exhausted the potash in the formation of their fruit, leaves, and wood, so that none remained for the future crops, his manure not having contained any potash."

It is therefore certain that if the farmer hastens his crops by the employment of an excess of ammoniacal manures, irrespective of a proper proportion of inorganic matter, he will eventually have cause to regret his proceedings.

There can be no doubt that if the farmer will take good care to keep up the proper supply of inorganic matter in the soil, the judicious application of moderate quantities of nitrogenous substances will be very beneficial to the hop. This we find is the regular practice of the hop-planters. But it is quite as well known to these practical agriculturists that an excessive application of ammoniacal and nitrogenous manures has always the effect of increasing the bine, but of diminishing the produce of the hop.

I have it, on the contrary, from some of my friends in the hop-growing districts, that the application of lime on heavy lands, is almost invariably attended by an immediate increase in the produce of the hop.

It was not my intention in my pamphlet at all to deter agriculturists from the common applications of rags, shoddy, &c., because I was perfectly aware of their utility. My intention was to recommend to the farmer a means of supplying to his land the mineral ingredients taken therefrom by his hops; that by supplying these substances in a cheaper form he might save his pocket, and for this purpose, with or without Mr. Lawes's concurrence, I must still be allowed to recommend the same means as I already have done.

With respect to one point in Mr. Lawes's letter, I much regret that a gentleman like Mr. L. should attempt such an indifferent piece of satire against science, as to tell us "that it is a very different thing to grow a good crop of anything theoretically in a crucible, and practically in a field." It ill becomes any man of the present day to sneer at science, by whose benefits and comforts he is on every side surrounded, and least of all does it become Mr. Lawes, who has himself benefited as much as most men by its application. It would seem that conversions of late have not been confined to one section of the community. The experience of three years from 1842 seems not to have been confined in its effects to high political society, but even to have made a convert in the scientific world.

We find the following observations in the supplement of Dr. Ure's Dictionary of Arts, under the article of manure:—"Manure.—A patent for an excellent article of this kind was obtained in May, 1842, by J. B. Lawes, Esq. He decomposes bones, apatite, and other subphosphates of lime, by mixing them in powder with as much sulphuric acid as will liberate enough of the phosphoric to dissolve the phosphate of lime. The free phosphoric acid is thereby ready to combine with the various alkaline earths contained in the soil, while the phosphate of lime is brought to a state of more minute division than is possible by mechanical means. Mr. Lawes also proposes to mix the above soluble superphosphate with such alkalies as are deficient in the soil, and thus to form a manure to fertilize it. His third improvement in manure is the formation and application of a liquor of flints (silicate of potash), for such soils as are deficient in soluble silica. The last compound he considers to be valuable for grounds much cropped with wheat, and other cereals that require a good deal of silica for their growth."

I would not for my part condemn a man for an honest change of opinion, even with the limited experience of three years; but I maintain he has no right to condemn so dogmatically, without due reasons shown, those very opinions in others which he himself so very recently thought worthy of his own credence and support.

In closing my letters, let me recommend to agriculturists to follow no system of partial manuring, for while they may with benefit apply guano and other similar manures, if they take care to have a proper supply of mineral matter, yet the continued application of such manures without the requisite mineral matters, will undoubtedly tend to reduce their farms to sterility.

I am at present engaged in the investigation of the organic portion of the hop, and shall take the earliest opportunity of publishing the results of my experiments. I am, Sir, your obedient servant,

J. C. Nesbit.

Agricultural and Scientific School,
Kennington, London, June 15*th,* 1846.

CALENDAR OF HORTICULTURE.—AUGUST.

Vegetable Garden.

Cabbage.—There are numerous varieties, but none surpass the early York, and the large, hearting York. Many persons like the sugar-loaf, Battersea, or Fulham, and the early "Stam." All affect a firm, but not binding, fresh loam; hence the richness of growth in the soil of a new-turned meadow, or in ground deeply trenched, and the spits reversed. Cabbage-seed need not go into enriched earth; but in every case a thorough digging and comminution are essentially useful.

The first week is generally the period to sow the seeds; but many extend it to the 10th. The agency of locality must decide; for it is certain that if the seed be deposited too early, the plants will be inclined to run, and can only produce greens or coleworts; while, on the contrary, if sown too late, they would remain feeble, and never attain the condition of sound, hearting cabbage.

People complain of cabbages *running up:* uncertain weather in the early spring, or even a very warm and stimulating autumn may have certain effects; but the usual cause may be traced to want of attentive observation to local habits, and to a due preparation of the earth. These remarks will apply to the cultivation of every vegetable; and therefore, once for all, the gardener is directed to make his land as deep as he can, by a thorough trenching, during which he will find out whether or not there is stagnant water at bottom, and a bad or good subsoil. If it be found that there are fourteen inches of sound, labourable earth, then, in all future digging, the spade should *take out* a full spit; a two or three inch stratum of dung ought to be laid on the ground so exposed, and this should be forked into the lower spit to its full depth. Finally, a similar layer of manure being laid on the upper surface, the spade must turn and work up the earth and manure, throwing them upon the portion prepared by forking. In this upper digging, every casual large stone ought to be removed (unless, indeed, the land be stony, when the attempt would be futile), and every clod reduced. The rake must next be employed to produce a level surface; and if drill-sowing be contemplated, a light iron roller passed over it would make a capital finish, and facilitate the drawing of true drills. Plants will *grow* in land so prepared; the difference would be striking, and an industrious operator would soon be convinced that the apparent labour of the processes repays itself in its results.

It is occasionally very difficult to command a supply of stable or farm-yard manure; yet that material is of vital importance in both field and garden, because of the *bulk* of decomposable matters which it confers on the soil. The artificial manures contain more *laborated* elements; and pure guano ranks the first and best of these; but what we and nature demand is *the act of laboration,* called decomposition. By this act, the consequence of disturbed electricity, the elements of the crude or half-prepared manure—that is to say, the hydrogen, oxygen, and carbon of the straw, and other vegeto-fibrous matters—are liberated in the gaseous state, and in that of fluid water; and at the same moment they recombine by electric-affinity into other substances suited to the constitution of individual plants. The nitrogen of the urinous matters attracts its definite quantity of hydrogen requisite to produce ammonia; and the silex, potassa, and other inorganic products of fermentation, are deposited in a condition wherein they can unite with water, and pass as sap into the sponges of the roots. During this decomposition, which could never occur with saline and artificial manures, heat is produced by the play of affinities; while laboration and imbibation of vegetable sap are induced and perfected.

Having offered these general remarks upon the effectual tillage and enrichment of garden soil, we return to individual operations.

Winter Spinach.—Sow for the early, general supply (not later than the tenth day), in drills, eighteen or twenty inches asunder; when the plants have produced leaves an inch or more wide, thin them out to small regular distances, and hoe the ground.

Broccoli.—Transplant the autumn "cape" and spring varieties. If the seedlings of May were duly pricked out in June, after the first showers, they will now have fine stocky roots. Reject all that are not clear and open at the hearts, and transfer the perfect plants to drills made in ground prepared as above directed, giving water immediately. If planted out into shallowish trenches, the broccolis being two feet asunder, their safety during winter is provided for.

Savoys, Scotch kail, borecoles, Brussell's sprouts.—The earlier these are planted out the better: all may stand two feet or thirty inches asunder; and the ground should be either fresh raised loam, or soil enriched, as before described. Be it remembered that where dung is applied liberally, it should, as in the farm, precede a *green* crop. Such is every member of the cabbage family, and turnips. *Potatoes, beans, peas,* all *legumes,* and the spindle-rooted vegetables, should not have the fresh manure near them; it ought to be reduced to the condition of *humus,* or vegetable mould within the soil, by time, and the previous action of a green crop upon it.

Sow early the last main crop of *turnips,* and put the dung in drills beneath, and exactly under the line intended for the seed, at least four inches below it. These drills ought to be twenty or twenty-five inches apart, and *with the seed* a slight sprinkling of charcoal dust is of striking utility. The same treatment will apply to the *onion* ; a small quantity of which may be sown before the middle of the month, for winter and spring use.

Carrots may be sown for a similar purpose; but this plant likes a fresh, deep, sandy loam, without stones; in such earth the roots will never fork; and in some soils of a contrary character none but the short "early horn" will ever answer.

Celery.—Transplant the last main crop, choosing fine stocky-rooted plants; the ground ought to be enriched beforehand by double manuring, and now should receive a shallow dress of old reduced stuff, to be incorporated with the earth at the time of planting. Plenteous waterings are required. Earth-up the first and second crops, as the plants attain a tall growth; but never when young, or so as to endanger the inner, sprouting leaves.

Lettuce and *radish.*—Sow twice, *i. e.,* at the beginning, and again about the third week.

At the middle, and in the third week, plant the green-culled *endive* for the last crop, and tie up for blanching that which was planted in June and July. Sow a little seed to be transplanted in September for a spring crop.

Onions examine—and go over the ground with the hoe once more.

Asparagus beds should be cleaned of weeds; and if in this forward season the haulm begins to ripen, it ought to be cut over to prevent the scattering of the seeds. Much remains to be said on this choice vegetable at the proper periods. Its quality and produce are in every respect susceptible of improvement.

Artichoke plants are very forward, owing to heat and aridity; they ought to be divested of the old flower-stems and dead leaves, and the growth of suckers encouraged by a light forking, and mulching with moist, short litter.

Small salads sow in succession; sow also fennel, angelica, corn-salad, chervil, and such-like garnish and flavouring herbs. Gather sweet and aromatic herbs, for drying in airsheds, and propagate the whole of them, if needful, by slips; but it is somewhat late to do this.

Last week.—Sow cauliflower seed at two different times, unless the first sowing (about the 21st) come up strong and abundant: more will be duly stated of the subsequent treatment of the plants.

Hoe and clean the ground, and above all, exterminate weeds at this season.

FRUIT DEPARTMENT.

Melons ought to yield abundantly. Abate watering, and give night-air in very fine weather. It is to be wished that the true Persian fruit were more known and cultivated.

Vines harden their wood soon after the first week, and will require less pruning. We never saw the grapes so forward as they were even on the 10th of July. In 1845 the berries had not set; bloom had not passed. In 1846 the berries already require thinning. If August be fine, we expect perfect clusters by the 10th; and that even the true Hamburgh will be coloured. Keep a certain covering of leaves, and only prune off straggling laterals.

Apricots, peaches, nectarines.—Look over the trees again, and secure all the retained branches and shoots. If some strong shoots produce secondary shoots, cut them entirely out, unless a blank want filling up, in which case, trim off all the fore-right and back-secondaries, and retain one or two of the best laterals.

Keep the fruit borders very clean, and free from weeds.

Fig-trees.—Train close to the best shoots; prune little, except for the removal of direct fore-rights. Shorten no shoots. The fruit will be very early; the mild winter permitted all the figs to pass it in safety.

Wasps have made their appearance early, and devour the sweeter gooseberries; were they ever before seen in the middle of July? Treacle or brown sugar and water, in bottles, attract and entrap thousands; but the best remedy is to destroy the nests; and, fortunately, boys are able and willing to undertake the work on very cheap terms.

TENDER FRUITS.

Grapes are either gathered or becoming ripe: in the former case, it is useful to expose the vines to the weather; and while so doing, the glazed sashes should be looked over, repaired, and painted. In the *latter*, air ought to be given freely; water, steam, or sprinkling withheld; and every opening should be guarded by coarse muslin or open calico, to prevent the ingress of wasps and flies, which soon disfigure a crop.

Fruiting Pines require plenty of sun and air. Succession plants as usual—a moist and full growing temperature. In *repotting*, never disroot; and employ rich, turfy, open loam, broken charcoal, chips of bones, and occasionally clear manure water, or in its place a solution of finely-powdered guano, made by adding one ounce (a small tablespoon) to a gallon and a half of pond water, stirred up till intimately mixed; by so doing you introduce sulphate. muriate, and phosphate of potassa, of soda, and of ammonia. A large portion of bone phosphate, of urate of ammonia, and a trace of phosphate of magnesia. Can any other appliance furnish equivalents of equally comprehensive value?

FLOWER GARDEN.

Divide herbaceous plants, and transfer to new sites, and fresh soil. Ever hold in readiness a store of light loam, mixed with leaf-mould and very old cow-dung, wherewith to renew small parterre plots, or parts of flower borders. Nothing so entirely renovates a garden as fresh earth, seasonably applied.

The usual operations tending to neatness and order need not be again described.

Our retrospect will be short. The weather became broken by thunder during the second week of July, and then there were sudden alternations of most intense heat and comparative cold. On the 18th leaves and branches were torn off and scattered; but the rain amounted to little, scarcely sufficient to reach two inches in depth. Peas have been burnt up; carrots, parsnip, and beet nearly failures in many places. Fruit is doubtful; many kinds are rendered small and acid; and strawberries were of no duration. The walnut-trees present a singular appearance; tall, lengthy shoots are formed at the summits of the upper branches; from one to two feet of which are garnished with abortions of leaves like spurious bracts, above which some true leaves endeavour to form. We suspect these shoots have been produced by the excessive heat of June. Potatoes, for want of water, protrude a second series of young tubers, to the great detriment of the yield. We observe no disease, though some persons insist that it exists; but that the early crops will be very deficient in most dry localities there can be little doubt. The weather was fickle and furiously windy to this date.

July 21.

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR JULY.

The weather of this month, taken as a whole, has been extremely propitious for the wheat crop, in nearly every portion of the United Kingdom; though, from the absence of that quantity of moisture almost indispensably necessary for barley, oats, beans, and peas, we regret to state that spring corn in general has not progressed very satisfactorily. In the forward districts, as well as in some of the midland and northern districts, the cutting of wheat has been commenced under favourable auspices; yet, as might be expected, only a very small quantity has been secured. However, new wheat was on sale in some markets prior to the 25th, in, comparatively speaking, good condition. It would be somewhat premature for us to offer a decided opinion as to the actual produce of this year's wheats; but we may observe that, from what we have seen, a full average crop is likely to be obtained in almost every county. So far, this is very gratifying: would that prices could induce us to offer the same remark! The influence of the new Corn Law—which we were told would have very little effect upon value—is now beginning to be severely felt. The immense quantities of foreign wheats lately pressing upon our markets have caused unusual heaviness to prevail in the demand for those of home produce, which, since the beginning of the present year, have fallen in Mark-Lane not less than EIGHTEEN SHILLINGS PER QUARTER! Where this downward tendency is to stop, we are at a loss to determine;

but this we may say, that so long as our markets continue to be inundated with foreign produce, and should the weather prove fine for the ingathering of the crops, even lower prices—looking to the important fact that most of our large millers have lately purchased immense quantities of United States and Canadian flour (which have sold at much lower prices than that of home-made) at extremely low figures, and thereby supplied their actual wants—may be looked forward to. As to the crop of barley, we conceive it will be barely an average one; and the same remarks may be applied to beans. Peas will, undoubtedly, be a short crop, though their quality may prove equal to that of former years.

In all quarters, the crop of hay—which is now nearly all secured—has turned out exceedingly good. Our markets have, consequently, been well supplied with both new meadow and clover, which have sold at low rates. Taken as a whole, the weather has been very favourable both for cutting and stacking. The stocks of old hay on most farms are large.

From most quarters, the accounts which have come to hand, relative to the potato crop, are somewhat unfavourable. As was the case last season, they are, we conceive, greatly exaggerated; yet it is almost placed beyond a doubt, from the numerous fields we have inspected, and the samples we have already seen, that the disease is spreading.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

One of the most important features in the cattle trade during the month just concluded must be considered the importations of live stock for our markets under the new tariff. As we have long predicted would be the case under a system of free trade, they have been considerably on the increase, both as respects numbers and quality. This, however, is a circumstance which all interested in the soil's productions had been led to expect; consequently, it now only remains a question of time as to the effects about to be produced upon the value of home-fed stock. It is useless to attempt to disguise the fact, whatever may be the arguments advanced by theorists, that superabundant supplies MUST eventually reduce value. This, then, is exactly the state of things we are, we conceive, to expect from a free importation of cattle. It has been long a favourite crotchet with some parties that a very considerable period must elapse ere any large supplies of foreign stock can find their way hither in a state fit for consumption; but they must bear in mind that very great exertions, some of which have already been crowned with success, are being made by the Dutch and German graziers to supply us with both beasts and sheep, as well as lambs and calves, equal to our own. To show that these exertions have been successful, we need only refer our readers to the stock exhibited and disposed of in Smithfield market in the past month, which, in many instances, has sold at prices quite equal to those obtained for our own stock. The imports into London in the course of the month have been as under:—

	HEAD.
Beasts	966
Sheep and lambs	3600
Calves	110
Total	4,676

At Hull they have comprised about 450 head of beasts and sheep, chiefly from Rotterdam; and at Plymouth 266 oxen from Spain—the latter in moderate condition, and which, consequently, have sold at low figures. Now if we add the above importations to those previously received this year, we shall arrive at a grand total of about TWENTY THOUSAND HEAD! At the same period in 1845 they did not exceed 4,000.

Fortunately for many of the graziers, the hot weather has prevented the transmission of any large quantities of slaughtered meat from various parts of the country to Newgate and Leadenhall markets, or the decline in the value of live stock in Smithfield, from the large numbers brought forward, would have been great. As it is, the trade has been in a very inactive state, at, as we have before observed, lower rates of value. At no previous corresponding period of the year do we recollect fat stock in general to have come to hand, and died so well, as since our last review. On each market-day, nearly or quite the whole of the beasts and sheep, if we except those of the former from the neighbourhood of the Metropolis, have been above the middle quality; yet considerable difficulty has been experienced in effecting clearances. The supplies on offer have been as follow:—

	HEAD.
Beasts	15,876
Cows	577
Sheep and lambs	184,510
Calves	2,837
Pigs	1,727

The above are the largest supplies on offer in any one month during the last *five* years. So much for a *shortness* of stock in the country! The bullock droves have come to hand as under:—

	HEAD.
Northern districts	4800
Norfolk, &c.	3800
Western and Midland Counties	2900
Other parts of England	2800
Scotland	290

The remainder have been derived from abroad and the neighbourhood of London.

The prices of beef have ruled from 2s. 4d. to 4s.; mutton, 2s. 10d. to 4s. 4d.; lamb, 4s. 8d. to 5s. 10d.; veal, 3s. 6d. to 4s. 6d.; and pork, 3s. 4d. to 4s. 10d. per 8lbs. to sink the offals.

Up to Newgate and Leadenhall markets the arrivals of slaughtered meat have been small, owing to which the trade has ruled tolerably steady at about previous quotations.

Per 8lbs., by the carcass.

	s.	d.		s.	d.
Beef.	2	4	to	3	6
Mutton.	2	10		4	0
Lamb	4	8		5	8
Veal.	3	4		4	4
Pork	3	4		4	10

ARRIVAL OF CARCASSES DURING THE MONTH.

	Beasts.	Sheep.	Calves.	Pigs.
Scotland	8	80	—	—
Yorkshire	48	400	—	270
Lincolnshire	69	130	—	200
Norfolk	56	120	—	90
Suffolk	46	110	—	90
Cambridgeshire	80	130	—	50
Essex	40	80	120	160
Surrey	114	220	180	310
Devonshire	—	—	—	100
Wiltshire	70	140	120	100
Other parts	110	240	220	310

SOMERSETSHIRE.

We are very busy reaping, and much more would be done if we could get hands: some few lots are secured, but this day's heavy rain, the most we have had these three months together, will require four or five days' fine weather to restore the wheat to good condition, besides stopping the reaping. There are some complaints of the kern, and a good deal is badly laid; and on the peat moors the produce will not be equal to last year, from present appearances; and on the richer soils the quality will be injured, and not equal to last year; but where it stands up, and on many other situations, if we have a good time to take it, the quality will be superior, and the kern better than last year. On the whole, I think the crop may be about an average of the two last years, both in quantity and quality; if anything, rather *under*. There is a very fine crop of winter beans, some of which are well secured in fine *condition*. There is a complaint of deficiency among the spring-sown ones; the leaves are prematurely turning black, and withering; the crop, in appearance, nearly an average. A good many peas are cut, and secured; the crop decidedly a failure; some as much as one-fourth less than last year; and quality is bad, being much worm-eaten. I think we shall have more than an average crop of oats, both as regards quantity and quality, if we have a good time to take them. The vetches are said to be well kidded, and there does not appear to be any fear of deficiency. The appearance of a crop of cloverseed was never more promising; indeed the appearance of the fields of this crop is splendid, and causes much passing notice. A good deal of the flax crop is secured; but it has ripened unwarily; and the seed, although rather abundant, will not be of the best quality. It is not quite so long as some years. The turnip crop promises to be large; and, if the weather breaks up from this time, the quality will be good, and more than an usual quantity likely to come off. In the lighter soils there are some good crops of Swede plants; but on the dry and heavier soils they have been sown over and over again to no purpose, the fly destroying them as fast as they come up; but we may have some good stubble turnips yet; although with this rain they will be much better than was expected; but carrots are a failure. The large stock of good hay has not been exceeded for years; but lately the after-grass has not grown much. The price of poor stock keeps up, while fat ones do not sell so well, at lower prices. Lambs for store have been worth 18s. to 24s. per head—a very high price to commence with: other sheep in proportion. There is some complaint of the disease in the feet among the cattle, but it is not widely spread. There has been a fair business done in wool, but by no means a brisk one: prices are hardly maintained, 10d. to 11d. long wool, 1s. to 1s. 0½d. shorn downs and the better sorts. We have had a very brisk demand for Flour this past month, both the millers and bakers supplying themselves from hand to mouth, and much less stocks are on hand of breadstuffs than in 1842, when we had a similar fall. The growers are by far the largest holders, and this week they have brought heavy supplies to the market, such as will not be maintained if we have fine weather these two or three weeks, when we may expect new. As regards permanent future prices, I do not think old will be maintained: this week's prices—6s. 3d. to 6s. 6d. best white; and 5s. 9d. to 6s. red; new 5s. 3d. to 5s. 6d., to 5s. 9d. for extra, but of this more in my next. For barley for malting purposes there is likely to be a demand: the crops do not promise so well as last year, although an average; and it is expected the demand for malt will be much greater, and the stocks are short at present: except small lots for grinding, nothing is passing in this corn. There is still a short supply of cheese, and a good sale at late prices. Since my last week's communication, I have heard from different parts of the county, and find the disease amongst the potatoes has been observed generally—in some parts to a much greater extent than others: seven acres were given up to one farmer by the poor men who had set and worked them, and in another case I heard of one and a half acre being ploughed up, and in another of their being given to pigs. To-day I have looked over the same that I gave a description of last week, and found the symptoms of the disease on the leaves had made rapid progress, and more of the potatoes under were affected—some about the size of plums were quite gone. I have examined the stalk, and can find no difference; but there is one thing I noticed, that potatoes with the disease were not the finest under the stalk, but those most directly under the stalk and closest to it, those growing at some distance being sound and well. Potatoes of different sorts near the part of the field affected were all more or less so, while in some other sorts, set at the same time, the disease, if at all, was scarcely perceptible. There is one field near, ploughed up from grass this spring, where the disease has just commenced: some very fine ash-headed kidneys I saw dug there, were five or six pounds in about a bag of 120lbs., the rest very good. I have enclosed some leaves, showing the progress of the disorder. The consequences begin to be much dreaded by the poor.—Street, July 24.

METEOROLOGICAL DIARY.

Barometer.			Thermometer.			Wind and State.		Atmosphere.		
Day.	8 a. m.	10p.m.	Min.	Max.	10p.m.	Direction.	Force.	8 a.m.	2 p. m.	10 p. m.
	in. cts.	in. cts.								
June 21	30.23	30.12	63	78	58	E. by North	lively	cloudy	sun	fine
22	30.63	29.80	58	82	72	E. to S. W.	brisk	cloudy	sun	cloudy
23	29.68	29.68	58	64	58	S. W.	brisk	cloudy	cloudy	cloudy
24	29.56	29.45	51	62	54	W. by North	brisk	cloudy	cloudy	cloudy
25	29.50	29.65	50	63	55	W. N. W.	brisk	fine	sun	fine
26	29.67	29.67	49	60	57	S. W., S. E.	gentle	cloudy	cloudy	cloudy
27	29.67	22.80	54	67	54	W. by South	lively	fine	sun	fine
28	29.87	29.86	55	68	62	S. by East	brisk	cloudy	cloudy	cloudy
29	29.85	29.88	57	68	58	S. West	brisk	fine	sun	fine
30	29.90	30.—	55	67	56	S. West	gentle	fine	sun	fine
July 1	30.01	30.01	52	64	59	S. West	brisk	cloudy	cloudy	cloudy
2	30.10	30.10	58	71	65	West	lively	cloudy	cloudy	cloudy
3	30.16	30.18	62	70	55	W. by North	gentle	cloudy	sun	fine
4	30.18	30.08	52	81	64	N. West	variable	fog	sun	fine
5	29.84	29.75	62	84	55	S.E., S.W., N.	brisk	fine	cloudy	fine
6	29.70	29.70	55	64	55	S. W. to West	strong	cloudy	cloudy	cloudy
7	29.77	29.90	55	64	57	N. West	gentle	fine	sun	cloudy
8	29.90	29.83	55	64	57	N. E. by E.	gentle	cloudy	cloudy	cloudy
9	29.76	29.70	57	67	62	S. E., S. W.	lively	cloudy	cloudy	cloudy
10	29.96	30.—	57	70	52	Northerly	gentle	cloudy	cloudy	fine
11	30.13	30.16	52	68	54	N. West	lively	fine	sun	cloudy
12	30.16	30.15	52	73	58	N. West	gentle	fine	sun	fine
13	30.14	29.96	54	80	62	Every way	variable	fine	sun	cloudy
14	29.80	29.85	59	85	61	S. W., N. W.	lively	fine	cloudy	fine
15	29.96	29.97	56	76	59	S.W., Various	lively	fine	sun	fine
16	29.86	29.56	58	74	59	S. West	brisk	cloudy	cloudy	cloudy
17	29.56	29.56	54	69	54	S. West	strong	fine	fine	fine
18	29.44	29.56	53	72	59	S. West	strong	cloudy	sun	cloudy
19	29.52	29.86	52	71	54	S. West	lively	fine	sun	fine
20	29.90	30.03	49	76	57	West	lively	fine	sun	fine
21	30.—	29.90	55	76	59	W. by South	strong	fine	cloudy	cloudy

ESTIMATED AVERAGES OF JULY.

Barometer.		Thermometer.		
High.	Low.	High.	Low.	Mean.
30.30	29.39	76	42	61

REAL AVERAGE TEMPERATURE OF THE PERIOD.

High.	Low.	Mean.
70.9	55.129	63

WEATHER AND PHENOMENA.

June 21, Clear afternoon. 22, Sultry; electrical clouds in the evening. 23, Thunder at dawn, and the first refreshing shower. 24, Gloomy and cool. 25, Showery; heavy thunder at 2 P. M. 26, 27, and 28, Occasional showers, but to no extent. 29 and 30, Similar weather; generally sunny. The week has been cold.

LUNATION.—Full moon, June 23rd, 5 h. 48 m. afternoon.

July 1, Attempts for rain. 2, Rain last night, cloudy. 3, Overcast early; brilliant day. 4, After early haze, fine and hot. 5, Thunder after oppressive heat: *this day or the 6th has of late years been noted for a storm.* 6, Some showers and wind. 7, Generally fine and clear. 8, 9, 10, Some showers, but no ground rain with us; the soil is still *dust* at the depth of 3 inches. 11, Heat begins to return, with powerful sun. 12, Clear, very fine. 13, Wind wavering, currents in every direction. 14, Oppressive heat, with some thunder, which cleared the air. 15, Fine summer's day. 16, Changeable and overcast. 17, Strong currents; wild, black clouds. 18, Fierce wind; one shower early. 19, Brisk wind, but finer. 20, Generally clear, and every way more promising. 21, Strong *wind-scuds* of rain, but nothing in quantity.

LUNATIONS.—First quarter, July 1st, 9 h. 23 m. afternoon; full moon, 8th day, 11 h. 11 m. afternoon; last quarter, 15th day, 1 h. 24 m. afternoon.

REMARKS REFERRING TO AGRICULTURE.

The drought has affected barley, oats, beans, and the lattermath of herbage. Oat and wheat harvest began with the second week. The latter has some defective spikelets, or rather, in their middle florets; but the perfect seeds are extremely plump. Showers are about, around, everywhere, but scarcely any fall with us: and now it is too late for rain to be of any benefit. *Potatoes* are not bulky. They appear healthy; but so droughted that the young tubers, being ripe, protrude secondaries in the early and middle-early varieties.

Maidenhead Thicket. JOHN TOWERS.

REVIEW.

THE BEE-KEEPER'S MANUAL.

By Henry Taylor.
Third Edition,
London: Groombridge and Sons, 1846.

This work is indispensable to the bee-keeper. The immense sale which it has had since its first edition is proof positive of the estimation it is held in by lovers of the apiary. He has, to sound practical knowledge of the subject, added descriptive plates of the various improved forms of hives lately invented. The structure and habits of the bee, so interesting to the naturalist, form in his hands subjects for the most pleasing descriptions: and what experience has proved to be correct he has followed out, to give directions of practical utility.

AGRICULTURAL QUERIES.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

Sir,—In your magazine for this month I find an account of a discussion " On the Cultivation of the Soil for the Growth of all kinds of Roots," by the Dorking Farmers' Club.

One of the speakers, Mr. Page, referred to a method of preparing the land for mangold-wurzel, which had previously occurred to me as being likely to be successful, viz.—to subsoil the land between every ridge immediately before the manure is deposited in the trench preparatory to sowing the seed.

Mr. Page was followed by Mr. Turvill, who expressed his disapprobation of this method, alleging as a reason, that " mangold-wurzel thrive best in a *firm* soil." It is to this last statement I wish to call attention. Should this meet the eye of Mr. Turvill, or any person of similar opinions, he would be doing good service to the farming interest by giving his reasons for this opinion. What renders explanation more necessary is the fact that Mr. T. appears to contradict in practice what he advances in theory; for he tells us in the same speech that he prepares his land for mangold-wurzel by ploughing it *three times* in autumn and *well pulverizing* it five or six inches deep in the spring.

It appears to me that the nature of the subsoil and the elevation of the land should be taken into the account in determining the propriety or impropriety of the method. My fear respecting it also is, that by loosening the subsoil in any case under the manure, the latter would settle down so rapidly, that the following crop would derive little or no benefit from it.

Hoping to have a little friendly discussion on the subject, I beg to subscribe myself

Your obedient servant,
July 8th, 1846. PULVERIZO.

TO THE EDITOR OF THE MARK LANE EXPRESS.

Sir,—I should feel very much obliged if you or any of your correspondents could favour me, through the medium of your excellent paper, with a few remarks relative to the best way of managing a meadow in my occupation, which can be irrigated *any time of the year*. Could it be advantageously watered immediately the hay is carried? How long should the water remain on? Indeed any advice upon the subject you could give would, in consequence of perfect ignorance, be considered doubly acceptable to

June 24, 1846. A Young Farmer.

ANSWERS TO AGRICULTURAL QUERIES.

TO THE EDITOR OF THE MARK LANE EXPRESS.

Sir,—Being a subscriber to your journal, I take the liberty of replying to your correspondent, who signs himself " Agricola," to inform him that I have used brans extensively for turnips for the last three years, at the rate of five cwt. per acre, and find it answer remarkably well on stone brash soils, and sandy loam. It is preferable to mix a few ashes with the brans, say twenty bushels per acre. I am, sir, yours, &c.,

June 25. A Vale of White Horse Man.

Sir,—In answer to " Agricola's" inquiry I beg to inform him that some years ago, having several tons of bran, for which I could find no market, the idea of growing turnips with it suggested itself to my mind, and I tried it that year on a small scale, hoping to succeed, so that any extra quantity I might have in following years I should be able to find use for; but I am sorry to inform " Agricola" that my experiments were totally unsuccessful. My first trial was on about half an acre of well prepared land. I first set the drills, and had the bran sown broadcast over them: I then closed the drills, and sowed the turnip in the usual way. My next trial was to set the drills, and introduced the bran with a common bone-drill, the same as if I had actually been sowing bones in each case. I used fully at the rate of one ton of bran per acre, which, had it succeeded, was rather an expensive experiment; both lots were a bad crop, and in my opinion the bran had not acted at all as a manure. I have several times since tried a few drills by mixing the bran with other manures, but could never perceive any improvement in the crops.

Remaining, sir, your obedient servant,
June 25, 1846. A Miller.

Sir,—In your *Mark Lane Express* of the 20th a "Nortonite" wishes to be informed if seeds sown in August are likely to be successful. In the summer of 1844, I experienced a similar failure of what he complains, and about the middle of September I sowed fresh seed, harrowed and rolled the ground, made myself a laughing-stock for many; but in the following summer cut the best crop of grass I ever had.

A Well-Wisher to his Neighbours.
Titchfield.

REVIEW OF THE CORN TRADE

DURING THE MONTH OF JULY.

Though a good deal was said previous to the new corn laws being carried, as to the comparatively trifling effect the introduction of the measure was likely to have on prices of grain, the influence has nevertheless been considerable. It would, perhaps, be unfair to attribute the reduction which has taken place in the value of wheat within the last month entirely to that cause; but that it has greatly contributed to produce the existing depression, cannot admit of a doubt. It would, indeed, be preposterous to suppose that the admission of nearly two million quarters of wheat, and one million five hundred thousand cwts. of flour, for home consumption, at almost a nominal duty, could at any time take place without affecting prices; and it would be still more unreasonable to expect that this could occur at a period when our own crop promised well, as in the present instance, and was at the same time nearly ready for the sickle. The consequence has, therefore, been precisely what we anticipated—the advance established in June proved temporary, and prices have since rapidly declined in all parts of the kingdom. Whether we have even now touched the lowest point, may be questioned; but, before entering into this consideration, we shall say a few words respecting the position of affairs relative to the prospects of the harvest.

We have approached a period of the year when something like an opinion on this head may be ventured on; still much must yet depend on the weather, and our remarks must therefore be offered in a qualified form. For wheat, the season has throughout been favourable; and, should we be blessed with an auspicious time for the ingathering, the crop would, in all probability, be superior to that of average years, both in quantity and quality. We are disposed to think, however, that, even under the most favouring circumstances, the yield would not be so extraordinarily good as many seem disposed to believe; in seasons like the present, when the general character of the weather is of a nature to encourage high expectations, the estimates are not unfrequently as much beyond the mark as in critical periods the mischief done is exaggerated. In either case the mind of the public is influenced, and expectation usually overshoots the mark. The very hot, dry weather experienced from the 21st of May to the 21st of June was not, perhaps, altogether so beneficial as was generally supposed; and we are certainly of opinion that a moderate fall of moisture about the time when wheat is in blossom is serviceable to the setting of the bloom. Either from the want of rain, or some cause not ascertained, the ears are not so perfect as we have sometimes seen them; and though, as already remarked, there is reason to reckon on a good crop, we much doubt whether it will prove so superabundant in quantity or superior in quality as in 1844. The weather from the 20th to the 25th was rather unsettled, and mischief has been done in different localities during the month by heavy thunderstorms. In many districts the corn has been badly lodged, and, should we now have a warm, moist atmosphere, sprout would become pretty general. In the southern counties a good deal of wheat and some barley and oats have already been cut, but hitherto comparatively little grain has been carried. Reaping commenced in the forward districts the first and second weeks in July; this is very early, and at least a fortnight sooner than last year. Since the 16th, harvest operations have been retarded by occasional showers, but we do not think that the rain has hitherto been productive of any real injury; the prospect as regards wheat is therefore, on the whole, cheering. In respect to spring corn the case is altogether different: in the first place, the seed was, in consequence of the extreme wet in the early part of the year, got in rather indifferently; and the subsequent drought proved very detrimental to both barley and oats on all poor, sandy soils. These crops, taken as a whole, have consequently never exhibited a very promising appearance; and we much doubt whether either will give a good return. Beans and Peas suffered still more severely by the extreme heat and want of rain in May and June; and it is admitted on all hands that the last-named articles are likely to turn out very indifferently.

The foregoing observations contain all that can at present be safely said respecting the probable result of the harvest; and so much must still depend on atmospherical vicissitudes, that even before what we are writing meets the eye of the reader, a great change may have taken place in our prospects.

Next in importance to the state of the crops on the ground is, unquestionably, the stocks still held by the farmers. On the latter point opinion varies materially; but we can discover no sufficient reason to come to a different conclusion to that before arrived at, namely, that the quantity of old grain in the hands of the growers is small. It is true that the deliveries of wheat have latterly increased; but this is invariably the case just previous to harvest, when farmers have to prepare for an extra outlay of cash. On the whole, the supplies from the growers have been decidedly small during the month, and, as there has certainly been little in the position of affairs to encourage them to hold back, it has strengthened our former conviction. Allowing, however, that the quantity of home-grown wheat in the country is somewhat less than at the corresponding period of the year in ordinary seasons, there is no reason for concluding that anything like a want of old can be felt, the bulk of the recently liberated foreign being still unconsumed. It must also be borne in mind that the harvest is likely to turn out well in many of the countries on the continent, which are in the habit of sending their surplus growth to Great Britain, and that, in consequence of the new corn laws, the encouragement to import has been very greatly increased. Under these circumstances, we feel convinced that the first year of free trade will be one of large importation and low prices; and we are not sufficiently enamoured with the new state of things to regard the latter as a benefit when it is a consequence of the former.

We shall now proceed with our usual review of the general course of business at Mark Lane during the month.

Until Monday, the 20th July, there were no indications of increased supplies of home-grown wheat; indeed, up to that period the quantity brought forward for sale was decidedly small, as well by land-carriage samples as coastwise. Prices, nevertheless, began to tend downwards from the commencement, and had already fallen 2s. to 3s. per qr. previous to the day named. The most important reduction did not take place, however, till then. With a larger show of wheat on the Essex, Kent, and Suffolk stands than on any previous occasion for at least two months before, and the finest possible weather for the harvest, something like a panic seized factors, and in proportion as they exhibited anxiety to realize, so did the unwillingness of millers to add to their stocks increase. The inevitable result of this state of affairs was a reduction in quotations of at least 5s. per qr. Even this concession has not been followed by an improvement in the demand; and, unless something should occur to cause a less favourable opinion than that now entertained respecting the probable result of the harvest, prices are likely to undergo a further depression. The transactions in foreign wheat have been on a much more restricted scale than might have been expected: this has been partly occasioned by holders having held the article at prices proportionately higher than those at which English has been offered. Mark Lane has been visited almost daily by millers and dealers from different parts of the country, in search of bargains; but they have generally expressed themselves disappointed at the rates demanded, and have therefore returned home without buying. The town millers have also acted with extreme caution: many of them had good stocks of bonded on hand when the new law came into operation; these they have entered for consumption, and there has therefore been no occasion to make immediate purchases. In this state of affairs it has become difficult to give quotations of foreign wheat with any degree of accuracy. At present the best descriptions of red Baltic might be bought at 48s., and fine high-mixed Danzig at 52s. to 54s. per qr., which shows a fall, when compared with the rates current at the close of June, of 7s. to 8s. per qr. The prices named can, however, hardly be considered the real value, as it would be impossible to sell largely without tempting buyers by accepting much lower terms. The official return of the entries for consumption during the month ending the 5th inst. in the United Kingdom, has not been published yet; since then the arrivals from abroad have not been large, but what has come to hand has been at once cleared in for home consumption from on board ship; there are consequently no stocks in bond at present. At one period of the month there was some inquiry for lock wheat for export to France; and as the most recently received reports from that country do not speak favourably of the crops, it is by no means improbable that the demand may again revive. Importers may, therefore, deem it worth while, as the duty has now risen to 6s. per qr., to store what may hereafter be received from abroad in bond for the chance of an export demand.

On the coming into force of the new law, most of the metropolitan millers were completely out of stock; the London bakers had also, in anticipation of the event, left themselves nearly bare of flour; and for some time the former were unable to manufacture with sufficient rapidity to supply the pressing wants of the latter. In this state of affairs foreign Flour was very extensively taken, not only by the dealers and bakers, but also by the large millers, who, after mixing it with a proportion of fresh-ground English, were enabled to send it out to their customers at a price they could not have afforded for that of home manufacture. The best brands of American, consequently, met a ready sale for a week or two after the clearing-in of the bonded, at 27s. to 28s. per brl.; subsequently, however, the demand fell off, and latterly sales have been made with difficulty at 26s. per brl. Since then the arrival from abroad have been rather considerable, and nearly the whole of what came to hand previous to the 23rd inst., when the duty rose a step, has been cleared in. Whether the same course will be adopted with subsequent receipts may be questioned, as there is generally an export demand for this article, which may give importers a chance of obtaining proportionably better prices in bond. Until Monday, the 20th of July, the nominal top quotation of town-made Flour remained stationary at 49s. per sack; but the continued decline in wheat having greatly lessened the cost of manufacture, the millers agreed on that day to reduce the price 3s. per sack. A corresponding fall has also taken place on ship Flour, but even now the value of English is relatively higher than that of foreign; and the latter, consequently, commands a preference.

The supplies of home-grown barley have been unusually short, nor have the reports of the appearance of the outstanding crop been particularly favourable; even under these circumstances little or no inclination has been manifested to buy this grain; and though the trifling nature of the arrival has prevented lower terms being taken, business has throughout the month been excessively dull. This may be partly accounted for by the fact that maltsters and distillers rarely buy much at this season of the year; whilst the demand for the lower descriptions, usually employed for feeding, has been lessened owing to the abundance of hay and green food, and the low prices of oats, Indian corn, &c.

In the early part of the month there was some activity in the malt trade, and choice qualities rose 1s. to 2s. per qr. in value. Latterly the inquiry has again subsided, and quotations are nearly the same now as they were at the close of June.

A greater alteration has taken place in the position of the oat market than might have been expected; at the period of our last monthly notice prices of this grain were advancing in all parts of the kingdom; at Mark Lane they were at least 3s. per qr. higher than at present. The first check to the upward movement was the breaking up of the hot, dry weather on the 21st of June. The showers which have at intervals fallen since then have unquestionably been of great service to the crop, but we doubt whether they can have wholly remedied the injurious effects of the preceding drought. The favourable change of weather, coupled with the liberation of upwards of 100,000 qrs. of oats from bond at this port, simultaneous with a material increase in the arrivals from Ireland and abroad, worked a complete revolution in the state of affairs. Sellers, who had previously had it all their own way, began to show more anxiety to realize; the dealers were not slow to take advantage of this feeling, and refused to buy more than absolutely necessary, and prices have consequently receded from week to week. The decline has been greater on foreign than on British-grown corn, but all descriptions have fallen considerably in value. Good English feed may at present be bought at 23s. to 25s., Irish potato at 24s. to 26s., prime Scotch at 28s., and capital foreign feed, such as Archangel, at 22s. per qr., duty paid. On most of the oats imported from the near continental ports the loss must be serious; many of these cost 18s. to 19s. per qr. free on board. The charge for freight, insurance duty, &c., cannot be estimated at less than 6s. per qr.; the balance is, therefore, considerably on the wrong side of the account. Whether prices have yet reached the lowest point depends, in a great measure, on the quantity which Ireland may still send us. The late material fall here, and the generally reduced state of the stocks on the continent, are likely to cause the foreign receipts to be small for some time to come; indeed, beyond the Archangel supply, which will probably be under 100,000 qrs., no arrivals from abroad of consequence can be reckoned on until after the new crop shall have been secured.

The advices from Ireland would certainly lead to the inference that they have not many old oats to spare for shipment; but experience has proved over and over again that the reports from thence cannot be much depended on.

Within the last week or two numerous complaints have reached us from the sister isle respecting the appearance of the main crop of potatoes. The plant is said to exhibit all the symptoms which characterised the approach of the disorder last year, and so confident are many of the Irish merchants that the disease will materially detract from the productiveness and injure the quality of the new potatoes, that orders have already reached Liverpool for the purchase of Indian corn on Irish account; and the value of the last-named article has recently advanced 2s. to 3s. per qr. at that port. Should the staple article of food on which the poorer classes of Ireland habitually depend for support unfortunately turn out so badly as is predicted, a greatly increased consumption of oatmeal would unquestionably follow; a circumstance which might have an important influence on the value of oats hereafter.

At one period of the month there was some disposition to speculate in beans: this was caused by the reported damage done to the crop by the drought.

Whether the injury is really as great as was represented may be questioned; but from the almost universal complaints of black fly, and from the ill-setting of the bloom, we are certainly inclined to think that the yield of this article will be deficient.

In the early part of the month, English beans rose 2s. to 3s. per qr., which advance has been maintained, though the demand has fallen off materially.

In consequence of the impression which generally prevailed that the duty on beans, peas, and rye was to be regulated as under the law of 1842, by the respective average prices of these articles, Egyptian beans in bond, which would in that case have been admissible at 1s. 6d. per qr. duty, continued in lively request at 28s. to 30s. per qr., until the new law came into operation. It was then discovered that by the new act of Parliament, this and the other articles named were to pay a duty the same as that chargeable on a quarter of barley, the duty on all being governed by the barley average. This was a great disappointment and loss to the buyers of bonded beans, as instead of 1s. 6d. they were rendered liable to 4s. duty per qr. A fall in prices to the extent of the difference, viz., 2s. 6d. per qr., has consequently since taken place.

The pea crop has probably suffered quite as much as that of beans by the generally dry character of the weather during the summer, and a short yield is expected. The few parcels of new which have hitherto appeared at Mark-lane have sold at 40s. to 43s. per qr. With the exception of being small, the quality of those we have as yet seen was good.

As it is perfectly certain that from henceforth all the surplus corn produced in foreign countries will find its way to the British markets, the probable result of the harvest abroad has become a matter of vital importance to the English farmer, inasmuch as by being well informed on that head he will in some measure be enabled to form an opinion as to the extent of the competition he may be subjected to in the sale of his produce. We shall, therefore, in future, devote a larger portion of our space than heretofore to remarks on the position of affairs abroad connected with the grain trade.

In following out this plan we have at present to consider whether the harvest of 1846 is likely to be abundant or the reverse in those countries which usually produce more than they consume. In handling this subject, we deem it best, in the first place, to direct attention to the north of Europe, as it is from thence England generally derives the greater proportion of her foreign supply.

From Poland, Russia, and the whole of Germany, the reports respecting the wheat crop have hitherto been favourable; and unless inauspicious weather should be experienced about the time of harvest, the produce is likely to be large all over the north and east of Europe. No great stocks of old wheat are held at any of the principal ports in the Baltic (Danzig alone excepted); still there is ample reason to conclude that when the new produce shall have been gathered, shipments on an extensive scale will be made to the British islands. Already prices are beginning to accommodate themselves abroad to the value of the article here. If there were any prospect of our really wanting wheat, the foreign merchant would probably be in no great hurry to consign, but would rather wait until the effects of scarcity had raised prices here. Under existing circumstances, however, there can be no motive for holding back; and we repeat, therefore, that shipments are likely to be commenced immediately after the harvest shall have been secured.

Letters from Danzig, of the 21st of July, state that holders of wheat had begun to manifest anxiety to realize, and that even the fine qualities previously held with so much firmness had been pressingly offered at reduced terms. Prices are nevertheless much too high there to allow of consignments to England with the slightest chance of profit, and shipments had, according to the latest accounts, almost wholly ceased. Fine high-mixed wheat was then still held at 43s. to 44s. per qr., which is very nearly the value at present in bond at Mark-lane, leaving nothing for profit and for the charges of transit.

The case is similar as regards the lower Baltic ports, good red wheat being quoted 43s. per qr. at Rostock on the 21st, and 44s. to 45s. at Stettin on the 18th inst.—rates altogether out of proportion with prices here.

At Hamburgh, wheat is likewise much too dear to allow of business being done with a view to the English market; but when it shall have been discovered that our crop is likely to produce well, affairs will soon assume a different aspect in the continental markets.

Holland and Belgium will probably grow enough wheat for their own consumption; but not sufficient to have any for export.

In France the harvest is not expected to be an average one, and in Italy, and other southern countries, a decided deficiency is reported to exist; as far as Europe is concerned, the Baltic ports are, therefore, the only sources from which large supplies are to be reckoned on.

Independent of the supplies which are sure to reach us from that quarter, we have strong grounds for supposing that the imports from the United States and Canada will be considerable before the close of the shipping season in America. In some of the southern states the crop of wheat has, it would appear, suffered from rust, blight, and a disorder there called "the scab;" but in the west, the great wheat-growing district, a very large yield was calculated on.

By the most recent advices from New York we learn that western flour had, in consequence of the anticipated superabundance of the crop, fallen to four dollars per barrel; being equal to about 18s. English money. The stocks of old wheat and flour were large at all the leading ports, as well as in the interior: and it was consequently deemed probable that prices would go lower, unless the downward movement should be arrested by an active export demand.

In Canada the crops were also favourably spoken of; and at Montreal, on the 28th June, the best brands of flour had fallen to 20s. to 21s. per brl.; being nearly 10s. per brl. lower than the opening price at the commencement of the shipping season.

CURRENCY PER IMPERIAL MEASURE.

JULY 27.

WHEAT, Essex and Kent, new, red	44	48	White..	48	52
Old, red	48	50	Do.	48	52
RYE, old	34	—	New....	36	38
BARLEY, Grinding, 24 26 Malting	28	29	Chevalier	30	—
Irish	22	24	Bere ...	22	24
MALT, Suffolk and Norfolk	58	63	Brown..	56	60
Kingston and Ware	60	—	Chevalier	65	—
OATS, Yorksh. & Lincolnshire, feed	24	25	Potato..	25	26
Youghall and Cork, black..	21	22	Cork, white	24	25
Dublin	23	24	Westport	26	27
Waterford, white 20	22	23	Black ..	21	22
Newry	26	27			
Galway	17	18			
Scotch, feed	25	26	Potato..	27	28
Clonmel	24	25	Limerick	27	28
Londonderry	26	—	Sligo	26	27
BEANS, Tick, new	36	39	Old, small	42	44
PEAS, Grey	38	40	Maple..	36	38
White	34	38	Boilers..	40	42

FLOUR, Town-made 45 47 Suffolk 38 — per sk. of 280 lbs.
Stockton and Norfolk 38 — Irish 41 —
Foreign, 25 28 per brl.

COMPARATIVE PRICES OF GRAIN.

WEEKLY AVERAGES by the Imp. Quarter, from the Gazette, of Friday last, July 24th, 1846.	s.	d.	AVERAGES from the corresponding Gazette in the last year, Friday, July 25th 1845.	s.	d.
WHEAT	50	10	**WHEAT**	50	0
BARLEY	27	10	**BARLEY**	29	6
OATS	23	0	**OATS**	22	4
RYE	36	5	**RYE**	32	8
BEANS	38	4	**BEANS**	39	9
PEAS	36	4	**PEAS**	40	2

IMPERIAL AVERAGES.

Week ending	Wheat.		Barley.		Oats.		Rye.		Beans.		Peas.	
June 13th	52	0	27	1	23	8	32	4	35	8	34	9
20th	51	5	27	3	23	3	33	4	36	4	32	6
27th	52	2	27	4	23	6	32	7	37	6	35	0
July 4th	52	10	27	6	23	8	33	3	38	5	35	5
11th	52	3	27	7	24	3	33	11	37	11	35	3
18th	50	10	27	10	23	0	36	5	38	4	36	4
Aggregate average of the six weeks which regulates the duty.	51	11	27	5	23	7	33	8	37	4	34	10
Duties payable in London till Wednesday next inclusive, and at the Outports till the arrival of the mail of that day from London	6	0	4	0	1	6	4	0	4	0	4	0
Do. on grain from British possessions out of Europe	1	0	1	0	1	0	1	0	1	0	1	0

PRICES OF SEEDS.

JULY 27.

SEED, Rape	20l.	23l.	Irish ..	--l.	—l.	per last.
Linseed, Baltic	40	44	Odessa	44	45	
Mustard, white	10	11	brown	—	—	per bush.
Linseed Cakes, English	—10l. 10s. to 11l. 0s. per 1000					
Linseed, English, sowing	50	60	crushing	43	45	per qr
Carraway	40	42	new ..	40	43	per cwt.
Coriander ......per cwt.	10	13				
Mustard, brown, new	10	11	white..	9	11	p. bush.
Hempseed........per qr.	35	38				
Trefoil	17	21	old ..	—	new 20	
Canary 46 48 fine	49	50				

PRICES OF HOPS.

BOROUGH, MONDAY, JULY 27.

The market is quiet. The duty is called about £145,000. From the plantations the reports are favourable on the whole.

MAIDSTONE, July 23.—We have had some smart showers within the past week, but they have been counteracted in their beneficial effects by the gales of wind which accompanied them, and the plantations are at present but little revived by the rains, whilst they have sustained considerable injury from the boisterous weather, being now in a delicate state of bloom, many poles having been down, and the bines and branches much torn and bruised. The best gardens in this district have made but tardy progress since our last report, and the middling and blighted grounds have gone on even more slowly, although the vermin has at last very nearly disappeared. Upon the whole, from the observations that we have been enabled to make, as well as from the reports that have reached us from various quarters, we do not consider that the plantations have advanced so satisfactorily as to warrant a continuance of the duty so high as £145,000, at which it has been estimated for some days past.

WOOL MARKETS.

LEWES WOOL FAIR was held this afternoon (July 20), at the White Hart, the Duke of Richmond in the chair. Among the company present were Lord Abinger, Sir Henry Shiffner, Bart.; H. Blackman, Esq.; J. W. Shelley, Esq.; John Ellman, Esq., &c.; several wool buyers and most of the principal farmers in the neighbourhood. The Earl of Chichester, who usually takes the chair at this meeting, was unavoidably absent. The Duke of Richmond, on the removal of the cloth, proposed "the health of the Queen," and the usual loyal toasts; after which his grace called upon Mr. Ellman to give the meeting some information upon the state of the wool markets. Mr. Ellman said the times were out of joint, and he had no information. In fact, he did not know what to advise, but he would make an offer to Mr. Legge of his wool, in order to show something like business. Mr. Ellman then offered his wool at 38s. per tod all round. It consisted of about 1,650 fleeces, of which number 350 were hogget. Mr. Legge declined the offer. He (Mr. Legge) did not know in the present depressed state of the market what to offer. Every thing was out of joint, as Mr. Ellman had truly stated, and nobody could tell what was before them. At present the market was completely paralysed, but he was ready to meet the graziers and give them the best price, if they knew what the best price really was. In the present state of things he was of opinion that wool would be still lower. Of one thing he was quite sure, there had been a great reduction in foreign wools, and vast purchases had been made. As many as 30,000 bales had found their way into the market, and where the manufacturers were to find money to meet such sales he could not tell. One thing was quite certain, if they expended it on foreign, they would have little for home produce. Mr. Shelley said that Lord Torrington had sold his wool at 14d. per lb., in answer to which Mr. Legge said that the markets had fallen considerably since that sale took place. The Duke of Richmond made an offer of his wool to Mr. Legge, but it was not accepted. His grace having apologised for being obliged to leave early, took his departure, and Sir Henry Shiffner took the chair. The best sale announced was that of Mr. Stenning Beard, who sold his wool, consisting of 820 ewes, 30 fat sheep, and 300 teg fleeces, at 33s. 6d. per tod, to Mr. Godlee. Mr. Street's wool, 223 tegs and 510 ewes at 34s. 8d. Mr. Woodhams sold his wool to Mr. Gibbs at 13d.—520 ewes and 200 tegs. Mr. James Hodson (Falmer) announced that he had sold 640 ewes and 230 tegs at 34s. per tod to Mr. Adams, Willingdon. Several sales were effected after this at a trifling advance. Sir H. Shiffner vacated the chair at seven o'clock, after which the meeting immediately broke up. The following purchases, the correctness of which may be relied on, took place subsequently to the dinner. John Ellman Esq.—Fleeces: 600 ewes, 400 wethers, and 500 tegs of the Glynde flock, and 800 ewes and 300 tegs of the Landport flock, were purchased by Mr. Wallis, at 35s. 6d. Messrs. Bine and Blaker, Patcham: 2,000 fleeces, rather more than one-third tegs, were purchased by Mr. Legge, at 33s. 6d. Mr. Lamb, Tullis Wells: 400 ewes and 140 tegs, at 34s. to Mr. Adams. Mr. Madgwick, Alciston: 13d. per lb. Mr. Alfree, Iford: 13d. per lb.

KELSO WOOL MARKET.—There was fully the usual attendance of merchants from all parts of the kingdom; but as they declined coming up to last year's prices, and the holders were unwilling to submit to material reduction, there was less business done than has been the case at this market for some years past. Sales proceeded very tardily, and comparatively few of the larger clips were disposed of. Towards the latter part of the day, however, several of the moderate sized bred and half-bred clips changed owners, at prices from 1s. to 1s. 6d. below those of last year; some choice lots of long bred wool with about two-thirds hog, brought 28s. per stone of 24 lb.; for some lots of half-bred, the greater parts of which were hog, 28s. 6d. was offered and declined; the same lots last year brought 30s. Half-bred wool, one-third hog and two-thirds ewe, brought 27s.; bred lots, with similar proportions, brought from 26s. to 26s. 6d.; some inferior clips brought somewhat lower prices. In Cheviot wools little or no business was done, and we are unable to quote prices for that description; buyers were hinting at a reduction of from 2s. to 3s. per stone, but we heard of no instance where this was submitted to by the sellers. The generality of farmers seemed disposed to hold on till St. Boswell's Fair, where, in all probability, a considerable amount of business will be done. Little or nothing was said about Highland laid wool, for which from 8s. to 8s. 6d. per stone was hinted at, but no business was done.

BERWICK WOOL MARKET was a very dull and inactive affair. The buyers were neither so numerous nor so eager to purchase as on many recent occasions. Bargains were late in being concluded, and these were generally at a reduction on the prices of last year of from one shilling to eighteen pence per stone. The market in every respect was similar to that held at Kelso on the previous day.

AYR WOOL FAIR.—There was a considerable attendance both of growers and merchants, but only a few sales were effected in the retail trade. Inverness great Wool Fair generally rules the country markets, and the transactions there were this season very limited, the owners holding out for high prices, and the dealers disinclined to yield, and, indeed, careless about making purchases. This was likewise the case at Ardrossan, and now at Ayr the example at Inverness also ruled. Among the exposers were Mr. Burnett, of Gadgirth; Mr. Crawford, of Doonside; Mr. Kennedy, Myremill; Mr. Hyslop; Mr. M'Latchie; and others; and the following may be taken as the quotations at which business was done: Black-faced white, 12s. per stone; cross betwixt Cheviot and black-faced, 13s. 6d. do.; Cheviot, 17s. do.; black-faced broomed, 14s. do.

LIVERPOOL, July 25.

SCOTCH.—The wool fairs in the north having gone off flat, has had its natural effect of reducing the price of laid Highland wool here, and also for the present of curtailing the demand. White Highland is neglected, the price of Russian and other low wools being lower in price in proportion. The stocks of good Cheviot and cross wools are light, and a poor selection, and, until the arrival of the new clip, we shall have little to report; but, as there has been a reduction in foreign wools that came into competition with them of from 1d. to 1½d. per lb., or about 25 per cent., they will have to come down in something like the same proportion.

		s.	d.		s.	d.
Laid Highland	Wool, per 24lbs	8	0	to	8	3
White Highland	do	11	0		11	6
Laid Crossed	do.. unwashed....	9	6		11	0
Do.	do..washed	10	0		12	0
Do. Cheviot	do. unwashed	9	9		12	0
Do.	do..washed	12	0		15	6
White Do.	do................	22	0		24	0

HIDE AND SKIN MARKET.

			s.	d.		s.	d.	
Market Hides,	56 to	64lbs.......	0	0	to	0	3	per lb.
Do.	64	72lbs.......	0	0		0	3	,,
Do.	72	80lbs.......	0	3		0	3½	,,
Do.	80	88lbs.......	0	3½		0	4	,,
Do.	88	96lbs.......	0	4		0	4½	,,
Do.	96	104lbs.......	0	4½		0	5	,,
Do.	104	112lbs.......	0	5		0	5¼	,,
Calf Skins			4	0		6	0	each.
Horse Hides			13	0		0	0	,,
Lambs.......			2	0		2	9	,,
Shearlings			0	10		1	0	,,

MANURES.

Subjoined are the present prices of several sorts of Manure:—

Agricultural Salt, 32s. per ton
Alkalies, 28s. and 42s. percwt.
Boast and Co.'s (Bow) Inorganic Manures, from 6s. to 11s. per cwt., according to crop
Boast's Guano, 9*l.* 9s. per ton
Carbon, 12s. per qr.
Chie fou, 21s. per cwt.
Chloride Lime, 28s. per cwt.
Clarke's Compost, 3*l.* 12s. 6d. per hhd., sufficient for three acres
Fothergill's Gypsum, 35s. pe ton.
Fothergill's Phosphate of Lime, 14s. per cwt.
Graves, 6*l.* 10s. per ton
Guano, Peruvian, 10*l.* 10s.; Bolivian, 9*l.*; African, 6*l.* 6s. to 7*l.* 10s. per ton, according to analysis
Gypsum, at the waterside, 35s. per ton
Highly Concentrated Manure, 30s. per qr.
Humus, 14s. per qr.
Hunt's Bone-dust, —s. per qr.
Hunt's Half-inch Bone, —s. per qr.
Hunt's Stuff Graves, 3s. 6d. cwt.
Hunt's new Fertilizer, 13s. 4d. per qr.
J. T. Hunt's Artificial Guano, 9*l.* per ton
Manure Powder, 16s. per qr.
Muriate of Ammonia, 20s. to 24s. per cwt.
Muriate of Lime, 6s. per cwt.
New Bristol Manure, 8s. per qr
Nitrate of Soda, 16s. per cwt.
Nitrate Potash (saltpetre), 25s to 26s. per cwt.
Patent Disinfected Manure 13s. 6d. per qr.
Petre Salt, 4*l.* 10s. per ton
Potter's Guano, 10*l.* per ton.
Preparation for Turnip Fly 10s. 6d. per pakt., sufficien for three acres
Rags, 4*l.* to 4*l.* 10s. per ton
Rape Cake, 6*l.* per ton
Rape Dust, 6*l.* 6s. per ton
Soap Ashes, 10s. per ton
Soda Ash, 14s. to 16s. per cwt.
Sulphate Soda, 6s. per cwt.
Sulphur for Destroying Worm on Turnips, 12s. per cwt.
Sulphuric Acid, 1½d. per lb.
Superphosphate of Lime, 8s. per cwt.
The Liverpool Abattoir Company's Animalized Manuring Powder, 2*l.* 10s. per ton
The Urate of the London Manure Company, 4*l.* 4s. per ton
Willey Dust, 4*l.* 4s. per ton
Wolverhampton Compost (Alexander's), 12s. per qr., subject to carriage to London, or forwarded from Wolverhampton

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of Deanston

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PLATE I.

PORTRAIT OF JAMES SMITH, ESQ., OF DEANSTON.

PLATE II.

THREE LEICESTER RAMS.

BRED BY MR. ROBERT SMITH, BURLEY-ON-THE-HILL, RUTLAND.

Our second Plate represents Three Leicester Rams, (from a group of seven, painted for Mr. Smith by W. H. Davis, and which have realized 700 guineas.) As a proof of the superior qualities of this flock, the 60 rams offered for sale in September, 1845, averaged 19 guineas each; 49 of which were purchased by ram breeders from various counties in England. By this flock Mr. Smith has received at least 50 premiums at various agricultural meetings; as also a prize this year for his shearling ram at the Royal Agricultural Society's Meeting at Newcastle (60 entries), for which Mr. Smith refused 70 guineas, being desirous that he should be included in his sale. The centre sheep (C, or Champion), a three-shear, purchased by Mr. Bennett, of Bickerings Park, Bedfordshire, at £120; the one to the left (No. 7), a two-shear, purchased by Mr. E. Clark, Canwick, near Lincoln; and the one eating (Union), a three-shear, purchased by Mr. Creswell, Ravenstone, near Ashby-de-la-Zouch, Leicestershire, all of which had been used by Mr. Smith in previous years; C, being the sire of the celebrated shearling purchased by Le Cte. Gaston de Blangy, au Château de St. Pierre, près Cherbourg, France. Union was the sire of the No. 7 shearling, in 1845, purchased by Mr. Robinson, Carnaby, Yorkshire; and No. 7 was the sire of the prize shearling this year at the Newcastle Meeting. We have also authority to state, that the fifty shearlings to be offered this year, on the 17th September, 1846, are superior to any former year, which must be a great satisfaction to Mr. Smith, he having resolved to relinquish the breeding of Leicester rams.

MEMOIR OF JAMES SMITH, ESQ., OF DEANSTON.

James Smith, of Deanston, was born in the city of Glasgow on the 3rd of January, 1789. His father was a respectable merchant of that city, a native of Galloway, in the south-west of Scotland. His mother was daughter of James Buchanan, of Carston, a landed proprietor in the west of Stirlingshire.

Mr. Smith's father having died when he was only two months old, the care of his up-bringing and education fell upon an excellent mother, who was kindly aided in her task by five of her brothers, all of them remarkable for enterprise and energy. The widowed mother went to reside with her younger brother Archibald, who was then the managing partner of extensive cotton-works at Deanston, in the west of Perthshire, he having been a pupil of Arkwright, the celebrated inventor of "Cotton Spinning by Machinery."

Young Smith was a bold, robust child, full of mirth and playfulness, yet observant, thoughtful, and intelligent beyond his years. From an early time he was fond of farming operations, and spent hours in walking by the side of the plough, or sitting on the cross-bar of the stiles talking to the ploughman, observing with delight the movement of the horses and the turning of the furrow.

As he advanced in years he took a great interest in the various mechanism which he saw in the cotton works, and all his amusements had relation either to farming or mechanical structure.

When about six years old he built, by the side of a little brook, a miniature cotton factory, of several floors in height; he constructed a little water-wheel, and, having placed it in its proper position, he covered it over with a brick arch or dome, which required considerable skill in constructing. About this period of his life he was a great breeder of pigeons, and his habit of observation led him to discover the peculiarities of colour and of structure which marked the descent through several generations, distinguishing in each individual those features which corresponded with the race, and those which were irregular or accidental. His ripened observations on this subject were most uncommon in so young a person.

When seven years old he went to school in Glasgow; and, when his playfulness would allow him, he found no difficulty in attaining the top of his class. At this age, as a proof of his bodily vigour, energy, and perseverance, he walked from Glasgow, a distance of twenty miles, in one day, and at the end of his journey he was so fresh as to be able to visit all the horses, cows, and poultry where he arrived in the country. His education was finished at the University of Glasgow. He studied mathematics in a private school, and was distinguished as the best mathematician of his class. As a chemist he understood all the theories of the day, and was a considerable experimenter; in prosecuting which he met with a severe accident, which deprived him of sight for several weeks, and might have rendered him blind for life. He was also familiar with all the branches of mechanical philosophy.

Moral philosophy and political economy he did not study at the University, but in after-life he bestowed considerable attention on both subjects. As a moral philosopher he adopted entirely the doctrines of phrenology, and in political economy he is a thorough follower of Adam Smith—of course an advocate for general freedom of trade.

Whilst studying at the University of Glasgow his holidays were spent with his uncle, Mr. Archibald Buchanan, a man of very superior character (who had then removed to the Catrine works in Ayrshire), where he devoted himself to the practical study of mechanics, engineering, and the details of cotton spinning; and there was no detail of art connected with those subjects which he could not perform in a workmanlike manner. And he has often said in after-life that he felt an infinite advantage in an intimate knowledge of the nature and qualities of material and workmanship. In the midst of all this study and practical application he never forgot agriculture; and as his uncle farmed about two hundred acres of his own property, he had ample opportunity of indulging in his favourite study. And whilst working twelve hours a day in the cotton factory or the machine shop, he has been known to spend three or four more on the farm. At that early time he contemplated the application of a knowledge of chemistry to the advancement of agriculture.

At the early age of eighteen, so complete was his knowledge in his profession, and so judicious was his character, that he was appointed to the management of the Deanston Works, where he had to put all his knowledge and energy to the task in regenerating a dilapidated work, and in collecting and training work people to the amount of about eleven hundred. This occupied the chief part of his time for several years; yet he found some leisure for exercise in athletic games with the work-people, and for grouse-shooting and coursing, of which he was at that time remarkably fond. He made great alteration in the system of education of the young, and in the cultivation of the manners and moral bearing of all the people, whilst he enjoyed the socialities of a good neighbourhood.

Having no land at this time on which he could exercise his propensity for the cultivation of the soil, he contented himself with visiting the farms around him, with attending the farmers' clubs, and encouraging them to improvement in the proper direction; he promoted the advancement of their practice, and improved his own and their knowledge and intelligence.

During the general war of Europe labour was very scarce and high-priced, and the farmers frequently found great difficulty in getting their crops cut down, which led him to turn his mind to the contrivance of a machine for reaping corn. At first he made a small model of tin-plate with his own hands, and in the summer of 1811 he had a working model made, which operated very effectually in the harvest of that year. His success encouraged him to make a larger one in the following year, to be worked by one horse and one man, and to compete for a premium of five hundred pounds, offered by the Dalkeith Farmers' Club, in East Lothian, for an effective reaping machine. When the day of the trial came, the machine met with no competitor, excepting an incomplete machine entered by a gunsmith of the name of Blackie, and the model of a "Heiland wifie" with her sickle, sent in a bandbox to the secretary of the society. The machine was put to work on an angular piece of ground upon a hanging bank, and with a very rough and uneven surface. The crop to be cut was oats, and although the machine made several very good cuts, laying the corn very beautifully, it was evidently too weighty for one horse to work; and the committee of the club, who were the judges, refused to award the premium, but encouraged Mr. Smith to return in another season with a two-horse machine. This was complied with; and in the harvest of 1813 Mr. Smith brought forward a very splendid machine, propelled by two horses and worked by one man. This machine was, however, so far unfortunate with the other; for having been put to work on the home-farm of the Duke of Buccleuch, in presence of the judges appointed by the Dalkeith Farmer's Club, after cutting a few ridges in an excellent manner, it fell into a sudden hollow, and the cutter having got fast in the ground, by the impetus of the machine and the power of the horses, some part of the wheel work was broken; and there being no means of repair on the spot, the working was at an end for that day, and the judges again refused to award the premium. If legally insisted upon, the premium might have been got; but Mr. Smith despised such means, and left the field disappointed but not daunted. The club some time after presented him with a piece of plate valued at fifty guineas, with an inscription setting forth that it was given to Mr. Smith for his meritorious *endeavours* to invent a machine for reaping corn. In the same season the Highland Society of Scotland appointed a committee to inspect the machine at work in Perthshire. It was accordingly exhibited before the committee in cutting oats, beans, barley, and wheat, all of which was executed in a very perfect manner, and the committee reported in most favourable terms, which induced the society to present Mr. Smith with a handsome piece of plate. Mr. Smith was afterwards presented with a pair of silver cups by the Gargunock Farmers' Club, in his own neighbourhood. And for a model of the machine sent to the Imperial Agricultural Society of St. Petersburgh Mr. Smith received a massive gold medal, transmitted through the Russian Ambassador at the British Court. About a dozen of these machines were made for different parties, but soon fell into disuse from the want of a proper preparation of the ground and want of management. The machine works very well on a crop which is not much laid, and when the surface of the ground is moderately smooth and uniform. Mr. Smith cut the bulk of his own crop for many years with this machine; the whole cost of reaping being under five shillings per acre, whilst the ordinary mode cost ten shillings.

Mr. Smith had turned his attention at a very early period to the subject of land draining, having seen a great deal of money so far fruitlessly expended in deep cross drains, intended chiefly for carrying off underwater. Furrow draining with turf had been introduced into the flat clay lands of Stirlingshire and the west of Perthshire about the year 1806 or '7, and Mr. Smith had, after he went to reside in Perthshire, opportunities of studying its effect, and the mode of action in draining off the water. He perceived that it was the water that fell upon the surface in the shape of rain which was carried off by these drains; and it then occurred to him that the same system of draining applied to the lands of the up-country would have the effect of carrying off the surface water, which so generally stagnates, especially in cold clay soils, and which is, in fact, the cause of their being cold and tenacious in wet weather, and hard and unworkable in seasons of drought. Not having any land in his possession at this period, he endeavoured to persuade his farming friends and neighbours to make the experiment; but no one would venture. He at length succeeded in persuading his uncle, Mr. Archibald Buchanan, of Catrine Bank, to make a trial on stiff, compact clay, the débris of the new red sandstone; this trial was successful, and induced Mr. Buchanan to go on over his whole farm, which had been previously drained with deep drains. Unfortunately Mr. Buchanan could not be persuaded to make the drains more than twenty inches deep, which very much diminished their effect and durability. In the year 1823 Mr. Smith got into his possession the farm of Deanston, consisting of a hundred and eighty-nine acres, and to which he afterwards added about twenty-five acres more. Upon this farm he was determined to put his views of thorough draining and deep working fairly to the test, desirous to attain a system of garden culture over the whole farm. The land consisted chiefly of the drifted débris of the old red sandstone, and of various texture; some parts of the subsoil consisting of hard compact soil with stones, and some in the hollows of sandy clay, composed of the soil which had been washed for ages from the higher parts of the ground: the whole was very much interspersed with large boulder stones, some of them very near the surface. The active soil was in general very thin, in many places not exceeding four inches. Much of the surface was studded with rushes and other water plants, whilst the drier knolls were covered with heath, furze, and broom. After much consideration he resolved to carry one uniform mode of drainage over the whole surface of the farm. He fixed upon thirty inches as the best depth to ensure at once efficiency and economy. He laid parallel lines of drains at twenty-one feet apart over the whole surface of each field, without regard to the apparent wet or dry condition of the soil; and he carried those parallel drains as near as possible in the direction of the steepest descent, as being best fitted for carrying off the water quickly. Of course he provided proper outfalls for the main receiving drains. Having abundance of stones—partly on the surface, partly in the subsoil, and partly in old stone fences—which he resolved to remove, he arranged to preserve the open of the drains with the smaller stones, or stones broken to the size of a turkey's egg. The drains he had cut narrow at the bottom, not exceeding four inches in width, in order to confine the current of water to a narrow channel, thereby ensuring the removal of any casual deposit. He filled up the drains to the depth of twelve inches with stones, leaving eighteen inches from thence to the surface for the working of the plough. He very soon discovered the propriety of closely covering over the stones to prevent the water having any direct access, which he accomplished by using a very thin turf, closing in the whole drain, and over this he caused the stiffest soil he could find to be tramped firmly down.

This mode of placing the drains proved most successful, and effected a thorough and uniform dryness over the whole surface. He had not proceeded far in deep ploughing when he discovered the necessity of having a powerful instrument to stir up the subsoil, and remove the stones which everywhere obstructed the plough. This gave rise to the invention of the subsoil plough, which was designed to stir up the subsoil without bringing it to the surface, or to mix in any material degree with the active soil, as he found that sterile subsoil injured the productiveness of the active soil when mixed with it, before having been exposed to the action of the air for some years. Mr. Smith proceeded in applying this system over his whole farm, and the yearly results of the crops proved the correctness of his theory, and his farm soon became the attraction of enterprising and intelligent agriculturists. He had still great difficulty in persuading his neighbours to make trial of his system to any extent; and it was not till they had seen the result of successive crops that they followed his example: even then they made their trials on a small scale.

Mr. Smith discoursed for many years in private conversation, and at the meetings of the local agricultural clubs, on the importance of a thoroughly dry condition of the soil, and of a depth of working resembling the operations of the gardener; but he never published any paper on the subject till the year 1831, when he contributed a paper on "Thorough-draining and Deep Working," for publication in the first report by the Drummonds, of Stirling, of their Agricultural Museum. This paper attracted considerable attention in the limited sphere of its circulation; but it was not until the sitting of the Committee of the House of Commons appointed to inquire into the causes of, and the remedies for, the generally prevailing agricultural distress of 1834, that the general attention of the public was called to the subject of the paper. Mr. Smith having been casually in London was requested by Mr. Patrick Maxwell Stewart to submit to an examination by the committee on his system of "Thorough-draining and Subsoil Ploughing;" and the result of this examination caused a very considerable excitement, especially amongst those members who took a deep interest in the *improvement* of agriculture. This committee, it will be remembered, separated without making any report; but Mr. Shaw Lefevre, the chairman, addressed a letter to the speaker of the House of Commons, in which he referred specially to the system of thorough-draining and subsoil ploughing, detailed to the committee by Mr. Smith, of Deanston, as being the only thing likely to promote the general improvement of agriculture, and to aid the farmers in overcoming their difficulties. Mr. James Loch, then member for Wick and other northern boroughs, who was a member of the committee, afterwards published (chiefly for the benefit of the tenantry on the various extensive estates under his management) a descriptive account of Mr. Smith's system, highly praising it, and recommending it for adoption. Mr. Smith's examination before the committee of the House led him to the acquaintance of the late lamented Mr. Henry Handley, who shortly after went to Scotland, for the express purpose of being present at one of the itinerant meetings of the Highland Society of Scotland, and of visiting Mr. Smith's farm; and it was upon the occasion of this visit that Mr. Handley collected from Mr. Smith and others that information which, with his own intelligence and sound judgment, enabled him, in conjunction with the late Earl Spencer, the Duke of Richmond, Mr. Shaw and others, to chalk out the outline for the framework of the Royal Agricultural Society of England, then about to be established.

The farm of Deanston became more and more the point of attraction for all improving agriculturists; and a vast number of agriculturists of all ranks, from Scotland, England, Ireland, and the continent of Europe and America, crowded every year to visit it. Being the only example extant of a whole farm thorough-drained and subsoil ploughed, it was besides remarkable for the convenient arrangement of roads and fields, the neat condition of the fences, which were all of white thorn, and planted and reared by Mr. Smith; and there was not an open ditch on the whole farm. The water for the supply of the fields was acquired under cover, from the drains, and was brought to the surface by pumps, pipes, and water-troughs, very simply arranged. The surface cultivation was also quite a pattern; the fields were remarkably free from weeds; and the crops, in their season, were always luxuriant. A turn-wrest plough, also an invention of Mr. Smith's, was to be seen in operation, by which he at all times worked his fields in one uniform surface, without ridges and furrows. Mr. Smith was also about this time the inventor of the web-chain harrow; an implement of great merit and usefulness, though not yet fully appreciated. Mr. Smith made many experiments in manures, and in various subjects connected with cultivation. Few men possess so many acquirements as Mr. Smith, fitting him for fully understanding all the bearings of agriculture; and his natural turn for minute observation, and his habits of design and economic arrangement, give him great advantage in working out improvements himself, and in judging of those brought forward by others; and his opinion is justly looked up to, on all subjects connected with agriculture. He has done much for agriculture already, but the world expects still more from his great experience, and especially from the opportunities of observation and comparison which his present occupations afford him. He is engaged in giving advice on drainage and culture in various counties, and he conducts the land valuations of some of the most extensive lines of railway; and he is in the practice of making minute examination of the state of agriculture in the various districts of Scotland and England; and we hope he will, ere long, give to the public in print some account of the results of his investigations. Many people publish their thoughts and experiences too prematurely; but Mr. Smith, who thinks and knows more than most people, errs on the other side, and publishes too seldom and too little. We admire his caution, and his rule never to publish his thoughts or his experiences till he has satisfied himself by sufficient investigation, and, if possible, repeated practical trial. We have no doubt his occupations are incessant, though his habit is to rise early and sit up late; yet we think a more frequent publication of his views and knowledge would advance still more the progress of improvement. We venture to hope that greater leisure, as he advances in life, will afford him more time for giving to the public more of his valuable knowledge.

The demand for Mr. Smith's paper on thorough-draining gradually increased, and upwards of twenty-five thousand copies have been sold to be distributed all over the kingdom, carrying with them a knowledge of the most important practical improvement in agriculture which has been given to the world in our day. Mr. Smith states in this paper that the agriculturists of Great Britain might, by thorough-draining and subsoil ploughing, followed by an improved system of cultivation, successfully compete with any country in agricultural productions; and he emphatically pronounced that, by a general adoption of these principles, the corn-laws would die a natural death, and save a political struggle. Mr. Cobden, in his very first address to the Corn-Law League, quoted Mr. Smith's opinion of the capabilities of the British soil, if properly dealt with. Mr. Smith had considerable intercourse with Mr. J. B. Smith, Mr. Cobden, and others, at the commencement of their movement; but he considered the principle of the League unconstitutional, and their procedure rather obtrusive and violent, being an advocate for the diffusion of intelligence, on the economic bearing of the question, without abuse of the landed proprietors, or the use of expressions tending to alienate from them the attachment of the peasantry.

His views in political economy have always been thoroughly liberal, as the views of all must be who comprehend the first principles of that much abused science. Few men rejoice more in the diffusion of real intelligence and the progress of liberal opinions than Mr. Smith.

Whilst Mr. Smith was busily engaged in working out his improvements in agriculture, and in promoting the diffusion of knowledge of the results amongst his agricultural neighbours, he was still more extensively engaged in engineering operations, and in mechanism and manufactures. The engineering works designed and executed at the Deanston establishment are, we believe, considered to be models of their kind; and many bridges and other works designed and executed by him for his neighbours bear testimony to his boldness, engineering skill, and practical knowledge. In the cotton trade, in which he was extensively engaged, he has invented and introduced some of the most useful machines of the present day, alike remarkable for their popular beauty as for a display of scientific and professional knowledge, and for their simplicity and efficiency.

He was also the contriver of many simple and efficient self-acting tools, applicable to machine-making, at a time when the principle of self-acting tools was little known or appreciated. Machines of his invention are to be found in operation all over the world, and many inventions are now in embryo in his fertile imagination.

If remarkable for his dealings with matter, he is still more successful in dealing with mind, in rendering plastic, under his touch, the human character. Having under his immediate management upwards of a thousand people, and dependant on these a thousand more at their homes, he succeeded in drawing from them the greatest amount of work, whilst he promoted their ease and comfort, and secured their affections. His attention to the young is now rewarded by hearing from almost every quarter of the globe of the respectability and success in life of boys who were reared at Deanston. The village which he built at Deanston for the accommodation of the work-people was, in all points, a model for imitation. The sewerage he made complete; and even then he contemplated the collection of the sewage-water for enriching his farm. The houses of the villagers are well arranged, and generally kept in first-rate order, which Mr. Smith promoted by visiting the people frequently in their houses, in a familiar way correcting their backslidings by serious advice or by an agreeable joke, as best fitted the person or the circumstances. He has a peculiar faculty of discriminating human character; and, from his intimate intercourse with the people, he knew every individual, young and old, of the whole population of Deanston; and he was ever ready to give them advice in the most minute trifles, as in the adjustment of the most intricate case of worldly affairs. As a proof of the people's reliance upon his judgment and his justice, there never was a "turn-out" of the work-people during a period of upwards of thirty years, though in early years such things were rife elsewhere. At various times deputations were sent from Glasgow, and other places, to induce the people to revolt; but the people knew that whilst they had a master who would do them justice and kindness, he was one that would resist to the death any attempts to overcome his government. Whilst engaged in these various avocations he was one of the most active and useful magistrates of the county, and served for more than twenty years in the Yeomanry Cavalry of the district, commanding a troop.

How Mr. Smith, four years ago, left his beautiful residence, his former sphere of usefulness, and the happy associations with all around him, to reside in London, no one has been able to divine; it is supposed to have arisen from some disturbance in his association with his partners in business, and from a desire he had to place himself in a position from which he thought he could better promote the advancement of agricultural improvement, and in which, it is to be hoped, he will ultimately succeed; although hitherto he has been able to make less progress in that object than his ardent mind had led him to anticipate, but he waits with patience "the moving of the waters."

Soon after his taking up his residence in London he was appointed one of the commissioners for the inquiry into the sanatory condition of large towns; and, we believe, he rendered efficient services with his colleagues in making investigations, and in reporting their opinions of the fitting remedies for the vast amount of filth, disease, and wretchedness which presented themselves in every town visited. Mr. Smith was particularly struck by the obstacles thrown in the way of all improvement through the influence of the *rate-payers*, who generally oppose every improvement which has a tendency to increase their rates. He at once saw the fitness of the application of the sewage-waters to agricultural purposes, as a means of procuring funds for the improvement of the sanatory condition of all towns; and he made an estimate to show the practicability of attaining this great object, alike beneficial to the citizens and to the agriculturists of the surrounding country, which paper was published in the appendix to the "Report of the Health of Towns Commission." Seeing that nothing was likely to be done speedily by the Government in this great arm of improvement for raising the ways and means, Mr. Smith associated himself with Mr. John Martin, the eminent artist—the painter of "The Deluge," &c., &c.—who several years ago brought forward a magnificent design for the improvement of the Thames, part of which proposed improvement consisted in removing the sewage-water in floating tanks, to be discharged for agricultural purposes at various points on the banks of the Thames and the adjoining coast. Mr. Smith had suggested to Mr. Martin, at the time he was agitating his scheme, that *pumping and conveying by pipes* was the only practicable way of disposing of the sewage-water for agricultural purposes, and in which Mr. Martin at once concurred. Mr. Smith has within the last two years made many experiments to determine the practicability of the scheme, the results of which are so satisfactory and encouraging that he, in association with Mr. Martin, Mr. John James Moore, of the Isle of Man, a scientific and practical agriculturist of much skill and experience, and supported by a number of other scientific men and capitalists, went to Parliament this session for an act to comprehend the conveyance and application of the whole sewage-water of the metropolis, confining their operations, in the first instance, to the water of two large sewers in Westminster, the one furnishing upwards of six millions of tons per annum of this precious liquid. The Bill was at first opposed by all and sundry, with the exception of the Marquis of Westminster, the Lord of the

Manor, and the Court of Commissioners of Sewers for Westminster, who wisely afforded every facility, guarding of course their own interests. A short time will test the merits of this scheme, and we hope will add another laurel to Mr. Smith's fame for practical usefulness, which we have no doubt he will take delight in sharing with Mr. Martin and the other enterprising spirits associated with him.

Mr. Smith has latterly been much employed in promoting railways, no doubt as a matter of emolument as well as of patriotic view. He has been enabled to illustrate the bearing which the railway system will have on the general improvement of the intelligence, enterprise, and physical condition of the people, and he anticipates with confidence a general advance in agricultural improvement.

Mr. Smith has done much for Ireland, and is deservedly a favourite in the "Green Isle." He has given many practical lectures on thorough draining and subsoil ploughing at the meetings of the Royal Agricultural Improvement Society of Ireland; he has repeatedly received the thanks of that useful association, and they have wisely adopted the Deanston system as deserving the first place in agricultural improvement, and as employing the superabundant labour and increasing the productions of their country.

Mr. Smith is, in stature, about five feet six inches. He is come of a vigorous and long-lived race, and originally of an active and healthy constitution; in his own frame he is still in the full vigour of manhood, and embued with the mass of experience his past transactions have given him; we are entitled to hope that he will yet for many years take an active share in advancing the improvements of the country; even now few men have done more for the real and substantial interests of mankind than James Smith, of Deanston.

MINERAL MANURES OR STIMULANTS.

All the organic manures, when burned, leave ashes composed of earthy and saline substances. The action of these substances upon vegetation is quite unquestionable; and it is certain that an organic manure, were it ever so rich in azotised principles, and ever so assimilable, would still be imperfect, did it not further contain the truly mineral matters which plants require to meet with in the soil, in order to complete their growth, and bring their seeds to maturity. The most active organic manures are always abundantly provided with inorganic principles. Farm-dung (dry) contains about one-fourth of its weight of such substances; and the water which is used for irrigation invariably holds saline matter in solution. Nevertheless, repeated cropping will often end by depriving the soil of the mineral substances which plants require; the salts contained in the manure supplied are sometimes inadequate to meet the demands of successive crops, and then the return falls off. It is consequently necessary in certain cases to furnish the soil anew with saline matters, in order to supply the continual drain that is made upon it, or to meet the exigencies of particular crops, which are known to require an unusually large quantity of salts for their successful cultivation. It is in this way that clover, lucern, and sainfoin, require plaster (gypsum); the cereals, silica and certain calcareous salts; the vine, potash, &c.

Practice got the start of science in the application of mineral manures or stimulants. If their useful influence cannot be denied, as it cannot; if the circumstances in which it is advantageous to administer them, if the conditions and the doses in which they ought to be given to the ground, have been the subject of long and careful observation with farmers, it must still be admitted that we are far from understanding exactly in what way they act. This is another motive for continuing to study them with perseverance.

Calcareous Manures.—In certain soils we have said that the calcareous element is either wanting, or present in very small and inadequate quantity. Other soils, again, abound in calcareous matter; and observation appears to prove that the presence of carbonate of lime in a soil adds unequivocally to its fertility. The majority of the good wheat lands hitherto examined have been found to contain a notable quantity of this earth, or earthy salt. It is usual to put lime into the ground in the state of caustic or quicklime; this is *liming*, properly so called. But it is also applied in the state of carbonate; as when we make use of chalk or marl, or shell-sand from the sea-shore. The lime-stone that is used for burning is seldom pure; it frequently contains clay, quartz, sand, metallic oxides, and occasionally carbonaceous matter; frequently, too, it is so largely mixed with magnesia that it acquires peculiar characters; this is the magnesian limestone or dolomite. The purest carbonate of lime, by exposure for some time to a white heat, loses 43.7 of carbonic acid, and consequently contains 56.3 of caustic lime. Limestone is one of the most common of rocks, in the crystalline and saccharoid state, or of closer and finer grain; it often constitutes mountain masses, and is met with in every part of the geological series; it meets us as chalk in beds of enormous thickness, filling up extensive basins in the tertiary series; such are the chalk-beds of the south and west coasts of England, extending through the counties of Kent and Sussex, &c.

The only mineral substance with which chalk, limestone, or carbonate of lime is likely to be confounded, is gypsum or sulphate of lime. But it is easy to distinguish either of these salts from the other: carbonate of lime dissolves with effervesence in dilute hydrochloric acid; sulphate of lime is insoluble in this liquid. Carbonate of lime is quite insoluble in water; sulphate of lime is very sensibly soluble, and a copious precipitate falls on the addition of a solution of oxalic acid, or of oxalate of ammonia. Gypsum is always so soft that it can be scratched with the nail; limestone, save in the state of chalk, is generally so hard that it resists the nail.

The burning of lime for agricultural uses is carried on in the same way as for building, and other economical purposes. Burnt or quicklime is a very different article from chalk or limestone; it is powerfully caustic, or destructive of the organic tissue; and, instead of being altogether insoluble, it is now soluble in about 630 parts of cold water. All the world knows how lime from the kiln, when watered, rises in temperature, breaks first into larger, and then into smaller pieces, and finally falls down into fine powder; but every one is not aware that there is a true chemical union of water with the earth, and that the resulting powder is, in chemical language, a hydrate of lime—a substance which is much less caustic than pure lime, but still distinctly alkaline in its reaction.

It is generally admitted that the soil which is without a certain, and that a considerable proportion of the calcareous element, never possesses a high degree of fertility. This, in particular, is the opinion of English agriculturists, who apply lime with a kind of profusion; and the great improvement it frequently produces on the crops of grain leaves no doubt as to the advantages of the procedure. Still, it is now generally recognised that liming ceases to be useful upon lands that are already sufficiently calcareous, or that rest on a subsoil of chalk. It is, therefore, by supplying the calcareous element which land requires to constitute it a soil adapted to the growth of corn, that the application of lime becomes useful: liming, in fact, enables us to make this necessary addition at least cost. Like other mineral manures, lime of itself produces little or no effect; it is in concurrence with organic manures that it becomes truly useful; it is nowise, and never can become, a substitute for these.

The geological constitution of a country is, perhaps, the best guide to the necessity or advantages of liming. Soils that are derived from plutonic or igneous rocks, in which felspar, mica, or quartz predominate, are, on the face of things, likely to be improved by the introduction of lime. Direct analysis would of course give more decisive information on the fact. In any case, the measure recommended by prudence is to make a few preliminary trials upon the small scale; the experimental method is the only safe one in agriculture, when the question is in regard to the adoption of new plans. In England it is customary, in liming clayey lands, to allow from 230 to 300 or 310 bush. of stimulant per acre; on lighter soils the dose may vary from about 150 to 200 bush., according to their character. In France the quantity usually employed is greatly less, from about 60 to 70 bush. being all that is generally thought advisable, and this at intervals of seven or eight years. In the neighbourhood of Lisle little use is made of lime, although there the land is generally anything but calcareous; perhaps the want of lime is not felt, in consequence of the universal practice of employing the Flemish manure, which, as we have seen, contains ammoniacal salts (and both human urine and human excrement contain a large quantity of phosphate of lime and phosphate of magnesia in addition, the very salts that the generality of vegetables crave). In the vicinity of Dunkirk, however, lime is frequently applied in the dose of between 40 and 50 bush. per acre, and with effects that are said to continue for ten or twelve years.

The dose of lime introduced into the soil in different countries is, moreover, in a certain relation with the time during which the action of the earth is believed to continue; as the quantity administered at once is small, the dose must be repeated more frequently. Near Dunkirk they use from 40 to 50 bush. per acre, every ten or twelve years. In the department of La Sarthe, according to M. Puvis, they scatter on some 9 or 10 bush. only; but they do so every three years. This would lead us to conclude that soils which really wanted lime should receive a dose in the proportion of about 3½ bush. per acre annually. But the crops gathered from the ground every year certainly do not abstract anything like this quantity of calcareous matter; which would induce us to infer that after a certain time the land will contain such a quantity of lime as to make any farther addition of it unnecessary, at all events save at rare and distant intervals.

One of the great advantages which lime has over all the other forms or kinds of calcareous stimulants employed, is unquestionably the state of extreme sub-division which it acquires in the quenching. In the course of falling down into this extremely fine powder, lime, as has been said, combines with a large quantity of water. But the change experienced does not stop short here; the air always contains some 10,000ths of carbonic acid gas, for which the hydrate of lime has a powerful affinity; so that it absorbs this gas greedily, abandoning, at the same time, its constitutional water, by which, in due season, the hydrate of lime becomes changed into the anhydrous carbonate of lime. This process is always slow; more rapid at first, when the interchange between the carbonic acid and water takes place freely; it becomes gradually slower and slower, as there is less and less water left in the particles : the affinity of the lime for the water seems to increase continually in the ratio of the smallness of the quantity which it still contains. It must, therefore, constantly happen that, in incorporating lime in powder and partially carbonated with the soil, we also introduce lime that has preserved its causticity in some measure; it must be observed, however, that once intimately mixed with the soil, this lime must speedily pass into the state of carbonate, because the soil and the water with which it is moistened always contain a considerable quantity of carbonic acid. Though we commence operations with quicklime, consequently, it is carbonate of lime that is definitively introduced into the ground. I have thought this a point of sufficient importance to engage our attention for a short time, inasmuch as it simplifies the view of the end that is to be sought in applying lime. This, as M. Puvis has most satisfactorily established, is neither more nor less than the introduction into the ground of that proportion of the calcareous element which it either wanted originally, or which it has lost in the course of repeated cropping, in order to enable it to produce abundantly. Quicklime incorporated with the soil must pass, as I have shown, very rapidly into the state of carbonate; but, before attaining to this state, it may unquestionably re-act upon the organic substances it encounters, disorganize them, favour their decomposition; in a word, behave as it does when used in composts. On the other hand, in causing the destruction of organic particles already in a state of decomposition, it must produce an unfavourable influence.

Lime, previously quenched and cold, is generally spread by being raked out from the cart upon the field, in little heaps, from five to six or seven yards apart, each containing from half to two-thirds of a bushel. It is, or ought, then to be spread immediately as evenly as possible over the surface. There is only the disadvantage attending this mode of proceeding, that slacked lime is twice the bulk of lime in the shell or lump, and that by slacking, it takes up at least one-fifth of its original weight of water. There is saving of labour, therefore, in distributing the lime unslacked in heaps, and waiting the slow process of extinction and pulverization, by the moisture of the atmosphere. The lime is often laid in a corner of the field, and covered lightly over with vegetable earth to undergo pulverization, and this plan answers very well. Sometimes the lime, before being laid on, is worked up into a kind of compost with vegetable mould and other matters; this is all matter of calculation as to cost. If our object be to supply the soil with the calcareous element it wants, the proper procedure is quite obvious.

The mode of using lime, with reference to other improvers of the soil, varies in different places. In one place it is usual to lime and to dung alternately; in others, the two operations are done together, or very close upon one another. There are some lands so fertile that they produce abundantly under the influence of lime alone. In laying on lime, one general rule is, that the weather should be dry, and the ground well drained; the end of summer is, probably, the most favourable season. To say nothing of the difficulty of spreading the lime in wet weather, if it is at all fresh, its caustic qualities are brought into immediate play by the moisture : and it destroys the roots of living vegetables, and the organic elements of the soil; and, again, it is quite certain that lime produces very little effect upon undrained and wet lands. In England lime is very commonly used upon fallows, in the course of the summer, and before sowing the wheat, for which fallowing is always a preparation. When it is given to land destined for beet or potatoes, it is led out in the spring, and spread before the young beet is transplanted in the one case, the seed potatoes deposited in the other.

It is always matter of great moment to have lime spread evenly; a thorough harrowing, and a double *superficial* ploughing, incorporate it sufficiently. According to M. Puvis, who has made a particular study of the subject of liming as practised in the department of the Ain, a quantity of lime amounting to 8250 bush., spread upon seventy-seven acres of land in the course of nine years, produced so decided an improvement that the returns from winter grain crops became the double of what they had been before.

Marl.—Marl, in a general way, may be regarded as a mixture of carbonate of lime and clay, in very variable proportions. Occasionally, the clay is replaced by sand; whence the titles "sandy marl," "argillaceous marl." The article, in short, contains from fifteen to as many as ninety per cent. of carbonate of lime. It presents numerous shades of colour. Geologically speaking, it is usually met with in fresh-water formations of the latest date: the upper strata of the Jura limestone are frequently covered with deposits of argillaceous marls, and we see its formation going on at the bottoms of lakes and ponds at the present day.

The distinguishing property of a calcareous marl, whatever admixture of other matters it contains, is that of crumbling to pieces under exposure to atmospherical influences. Every limestone rock that has this property may be considered and employed as a marl. The grand purpose of putting marl upon land is to supply it with the calcareous element it wants. To marl land, is, therefore, tantamount to liming it; the effect is the same. The value of the article is, indeed, so well known, that considerable expense is constantly incurred to get at the beds of it that form strata in the crust of the earth, or that lie at the bottoms of lakes. It appears to have been employed from the remotest antiquity.

The reason why marl and marly limestones fall so completely into powder is obvious. If the mass, when wet, form a pasty mass, it shrinks as it dries, and cracks in all directions; if more consistent, it is still always porous; and, having imbibed a large quantity of rain in the autumn, this congeals during the frosts of the succeeding winter; and the ice expanding with almost irresistible force, separates the particles, which cohere indeed so long as the frost continues, but fall away from one another on the first thaw, by which the solid rock of the autumn and winter becomes a heap of dust in the spring. In the same way we see chalk, exposed to the wet and the frost, fall down to powder, and, in virtue of this property and its constitution as carbonate of lime, employed with perfect success in lieu of lime and marl. Wherever there is a bed of chalk at hand, it is needless to go farther in search of marl and quicklime, in so far, at least, as the calcareous principle is concerned. Argillaceous marl and sandy marl must, of course, act in two different ways upon the soil; in virtue of the calcareous element in either case, and in virtue of the argillaceous principle in the one, of the sandy principle in the other. And the kind of soil for which they are severally adapted can be conceived beforehand. To a stiff, clayey soil we would naturally add the sandy marl; to a light, sandy soil we would supply the argillaceous product, and thus effect improvement by a kind of double tide. It is, therefore, very important to distinguish between these two effects produced by marl: one mechanical, connected with the presence of clay or sand; the other chemical, and depending on the presence of carbonate of lime. It is to these two effects separately and combined, that all the influence of marl is usually ascribed by practical agriculturists.

From certain inquiries common to M. Payen and me, however, it appears that marl must act in yet another way. Our analyses show that it always contains a certain, though variable, proportion of azotised matter. And there is nothing extraordinary in the discovery of this fact; it is no more than might have been anticipated from the geological circumstances attending its production. Marls are, as has been said, always connected with the most recent formations of the tertiary series; they are constantly accompanied by remains which attest the presence of organic beings; and frequently they consist of little else than shells, and the disintegrated dwellings and bodies of moluscas, and madrepores, and corallines, and other inferior forms of things that once had life. It is by no means astonishing, therefore, that deposits which have had such an origin should still contain evidences of the presence of the softer and more decompoundable, as well as of the harder and more rebellious constituents of the beings to whose existence they are due. One sample of marl which we analyzed gave 0.002 of azote; another from the Lower Rhine gave rather more than 0.001 of the same element. It were therefore very proper, in analyzing marls, chalks, &c., to have an eye to their organic, or azotic, as well as to their mineral constituents; there can be very little question of the azotised elements being at the bottom of the really wonderful fertilizing influences of the marls of certain districts.

Marl ought, like lime, to be spread very evenly over the land; it is generally laid on in the same way as lime—in little heaps at regular distances, and then scattered abroad. It appears to be a very general opinion that it is not advisable to cover it immediately, or very shortly after it is dug from the bed that supplies it; the practice where its employment is most general, and probably best understood, is to let it lie exposed through the summer or winter, or even the whole year, before laying it on the land. It is also held not to be proper to cover in marl deeply. Marl is advantageously laid out in heaps upon stubbles in the autumn; and in the early spring, when it has been pulverized by the frost, it is spread with the shovel. When it is to be used with winter wheat or rye, it is laid on in the summer, and spread at the time of ploughing; the latter plan of proceeding, however, as Schwertz observes, can only be followed with marl that pulverizes readily. In England it is also laid down as a kind of principle that marl ought to be exposed for as long a time as possible to the influences of the atmosphere; that it ought to have a summer's heat and a winter's cold before it is applied. And that, in fact, which is at all consistent, and has not been exposed to the frost, scarcely pulverizes sufficiently to be readily miscible with the soil, even under the influence of repeated ploughings; moreover, it produces very little obvious effect upon the crop with which it is first used. After spreading, a rough harrow is passed over the surface of the ground, which is then ploughed superficially two or three times, the harrow being again had recourse to repeatedly, to break lumps, and so bring out the effect of the marl.

The quantity of marl that may be advantageously given, varies according to the circumstances of the district. Marl, it may fairly be said, is frequently abused. In an excellent paper on the subject, M. Puvis lays it down as a principle that the first element in the calculation of the proper dose of marl is the quantity of calcareous matter that is wanting in the soil. He says that every soil which contains more than nine or ten per cent. of carbonate of lime can dispense with marl; and that soils in which the lime falls short of this quantity may advantageously receive a dose, or successive doses, of the substance that will bring them up to the point. The proper dose consequently depends, first, on the proportion of carbonate of lime contained in the soil, and then on that which the marl itself includes.

Considered from the rational point of view which M. Puvis has taken, marling is no longer an arbitrary process, but one that may be conducted on determinate principles. The extravagant quantities that are often laid on without other assignable reason than blind custom, are shown to be, if not injurious, yet useless: the quantity of marl to be incorporated is determined by the quality of the substance which is at our disposal, and by the depth of the layer of vegetable earth taken in connection with its chemical constitution.

The use of marl produces an unquestionable effect on the productive properties of the soil. According to M. Puvis, the application of the proper dose of a sandy marl, containing from 30 to 60 per cent. of carbonate of lime, doubled the produce of a piece of parched land in the department of the Isère. Before the application of the marl nothing but dwarfish crops of rye were gathered, yielding at most three for one of the seed; at present, eight for one of seed, and that wheat, are obtained; and the good effects are found to continue for ten and even twelve years.

The action of marl is not unlimited, any more than that of lime, as the last sentence will give the reader reason to conclude. With every harvest a certain proportion of it is carried off, and the land is finally left with an inadequate quantity of the calcareous element, which then requires to be restored. The nature of the crop, however, has the most marked influence on the quantity of lime that is taken up and carried away from the soil. Allowing the broadest margin, and judging from the composition of the ashes of the plants that form the subjects of our ordinary crops, we can see that the quantity of 3½ bush. of marl of the usual composition per acre, which is assumed as the average quantity to be laid on, is vastly more than can be absolutely necessary.

Wood Ashes contribute to improve the soil. They contain, besides silica, both phosphate and carbonate of lime, and alkaline sulphates, phosphates, and carbonates. In a general way, everything derived from plants that have lived must be useful to plants that are about to live, or that are actually living. Although the utility of wood ashes, then, is generally admitted, the numerous purposes to which they are applied in the arts, and their high price which is the consequence of this, enable the husbandman to employ them but rarely on his land: they are almost always lixiviated in order to procure the carbonate of potash they contain. In countries which are thickly wooded, indeed, the trees are actually cut down and burned for the sake of their ashes, just as oxen are run down and slaughtered in the vast plains of South America for the sake of their hides.

The good effects of wood ashes upon vegetation is known to communities the least advanced in civilization. The Indians of South America burn the stems and leaves of the maize in order to improve the soil. The same practice occurs among the natives of Africa; on the banks of the river Zaire, according to Tuckey, the ground is prepared by having little piles of dried herbs placed upon it, to which fire is set; and upon the spots where the ashes are collected, they sow peas and Indian corn; these ashes are, in fact, the only manure that is employed.

In England wood ashes are esteemed as particularly useful upon gravelly soils; about forty bush. per acre are applied in the spring, where the article can be obtained.

The *lye ashes* from the soap-boiler contain a small quantity of soluble saline matter which has escaped the lixiviation, mixed with a large proportion of lime, partly in the state of carbonate, the lime having been added to bring the carbonate of potash, employed in the manufacture of soap, into the caustic state. This ash or refuse is much sought after, and is administered in quantities that vary from 45 to 70 bush. per acre—a dose in which its action is felt for ten years or more. In wooded districts, where there is a good deal of potash prepared, ash of this kind is obtained in large quantity; it is there employed alternately with organic manures. Ashes are applied in the same way as lime, with this difference, that it is held better not to plough them in until they have received a little rain. There are places where the ashes that remain in the lixiviating tub are thrown on in the dose of 170 bush. per acre.

Turf or Peat Ashes.—Peat is the result of a peculiar spontaneous change that takes place in vegetables. It is produced in bogs or swamps, and in connection with stagnant waters; turfy deposits are also encountered on the banks of rivers, in valleys, at the bottoms of former lakes, and at the mouths of rivers. Peat is met with from the level of the sea to the elevated platforms of the Vosges and Alps. It lies in horizontal beds, frequently divided by strata of gravel, sand, or clay. It is always a product of comparatively recent formation—a fact which is attested by the thin layers of vegetable soil that lie over it in many places, and the animal remains and products of human industry that are frequently encountered in it.

The state of the decomposition of the vegetables that form turf or peat is seldom so far advanced as to make the remains of the plants which compose it doubtful. It is of different kinds: hard or woody, and soft or herbaceous peat. Some of it is extremely compact, black, and like vegetable mould in appearance; generally speaking, it is light, spongy, and of a lighter or deeper shade of brown. When quite dry, it is often extremely light; a cubic metre, which is about one-eleventh more than a cubic yard, will weigh from five to six cwt.

The circumstances in which turf has been found lead us to infer that it must contain the elementary insoluble elements of the plants that produced it. It appears, however, to contain a somewhat larger proportion of azote than the average quantity met with in herbaceous vegetables, supposed dry; but we have seen that in the slow alteration of lignine azote becomes concentrated, as it were, in the residue; and that, in fine, mould contains a larger quantity of azote than the wood from which it proceeds. It appears, farther, from some experiments very lately performed by Mr. Hermann, that, during the putrefaction of the woody principle, azote is actually taken from the air to concur in the formation of certain products that are perfectly definite. Mr. Hermann quotes the following experiment:—

Twenty-eight parts of wood taken from a log already attacked with rot, and in which, indeed, there were several points already decayed, were moistened and enclosed in a jar, containing atmospherical air over mercury. The bulk of the atmosphere contained in the bell-glass was 262 volumes. The wood was kept there for ten days at a temperature of 75.2° Fahr. The apparent volume of the air continued unaltered to the end of the experiment; but a large quantity of carbonic acid had been formed.

Results on the Inclosed Air.

	Before. Vols.	After. Vols.
The air contained Azote	207	194
" Carbonic acid		40
" Oxygen	55	28
	262	262

The moist wood, in its decomposition during ten days, had consequently caused thirteen volumes of azote and twenty-seven volumes of oxygen to disappear. And Mr. Hermann found that it now contained principles analogous to those of humus; one of which, nitrolin, is highly azotised, and, by the ulterior action of air and moisture, gives rise to ulmate of ammonia.

These experiments of Mr. Hermann are new, and the conclusions to which they lead are both interesting and important.*

Turf or peat is, virtually, the woody principle in the last stage of modification by atmospherical influences; but it appears still to contain, although modified, the usual principles which enter into the constitution of herbaceous vegetables also. M. Payen detected a quantity of fatty matter in it, analogous to that which exists in leaves; and M. Reinsch found it to contain tannin. One sample of turf (from the neighbourhood of Moscow, by the way), examined by Mr. Hermann, yielded of carbonaceous matter, nitrolin and vegetable remains, 77.5; of ulmic acid, 17.0; extract of humus, 4.0; ammonia, 0.25; and ash, 1.25=100.0 The elementary composition of these varieties of turf, analyzed by M. Regnault, gave from 57 to 58 of carbon; 5.1 to 5.6 hydrogen; 30.8 to 31.8 oxygen and azote; and 4.6 to 5.6 ashes.

Turf or peat has, consequently, a certain resemblance to mould or humus; it differs, however, in the absence of substances soluble in water; and it is easy to imagine that, produced as it is, in connection with water continually soaked in moisture, soluble matters ought not to be expected in it in appreciable quantity. Peat might, in fact, be likened to the insoluble part of humus, left after lixiviation. And there is this farther resemblance—that peat, like the humus, which has been thoroughly lixiviated, if exposed to the air, by and bye acquires a quantity of soluble material, the evolution of which is also hastened by the contract of the alkalies. The employment of turf as manure, in some countries, confirms the propriety of this mode of viewing its nature and constitution; and then it is well known that bogs, consisting of pure turf, when drained and limed become tolerably fertile lands, yielding magnificent crops of oats and turnips especially.

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* Vide his paper in "Jour. für prakt. Chemie," B. xxiii., s. 379.

The ashes of turf we might expect to contain the mineral substances usually found in the ashes of plants, and, farther, a certain quantity of additional earthy matter. But this is not the case: several alkaline salts, indeed, have been discovered in very small proportion; but no chemist, to my knowledge, has ever even suspected the presence of any of the phosphates; a special search which was made for them in my laboratory failed to discover them. This is a fact which, I own, amazed me; some coal ash, and another ash produced from lignite, gave a result equally negative. We might imagine the disappearance of the soluble salts; but how the earthy phosphates should disappear, how the ashes of coal should come to be without a trace of phosphoric acid, when we see that the iron ore in connection with the coal fields is always more or less phosphorigerous,[*] is surprising.

Turf or peat ashes are valuable improvers of the soil, and are in great request among intelligent farmers. Analysis, in fact, indicates several substances in their composition as calculated to assist vegetation: carbonate of lime in a state of extreme subdivision; occasionally sulphate of lime (gypsum); calcined clay, whose action upon strong and retentive lands is always beneficial; silica in a favourable state for assimilation; finally alkaline salts, chlorides, sulphates, carbonates, and perhaps, in spite of the negative given by chemical analysis, traces of the phosphates.

The ashes from pyritic turf ought not to be used without great circumspection; they usually contain a quantity of iron pyrites which has not been destroyed in the burning, and which, exposed to the action of the air, gives rise to the formation of green vitriol, or sulphate of iron, which may prove prejudicial to vegetation. These ashes are generally of a red colour, and very heavy in consequence of containing a quantity of the oxide of iron. Good turf ashes ought to be white and light; the sack ought to weigh something less than a hundred weight. Schwertz recommends us to keep them from the wet; but at Bechelbronn, where we use large quantities of peat ashes, we find no ill effects from leaving them exposed to the rain; frequently, indeed, we moisten them with water from the dunghill, in order to add to their properties as a mineral manure those that belong to organic manures. On the whole, however, it is certainly better, for many reasons, to keep them dry; they are more easily carried, and they are more easily spread.

Turf ashes of a good quality, that is to say, which include in their composition a large proportion of calcareous and alkaline salts, are adapted to crops of every description; but it is upon clover especially that their influence is truly surprising. This fact is well established in Flanders; but one must have employed them oneself to have any adequate idea of the improvement they produce. There is no risk of giving too large a quantity. In winter, when we have peat ashes at our disposal, we give as many as 60 bush. per acre to our clovers; we scatter them even upon the surface of the snow, and distribute them by means of the rake in the spring. The Dutch use these ashes in still larger quantity, applying, at two different times, from 100 to 160 bush. per acre to their clover fields. According to Sinclair, the Dutch also make use of an ash procured from a turf, which, during winter, is in contact with brackish water—a circumstance which renders this ash particularly rich in alkaline salts. It is sowed by hand in the spring upon clover, and the following year an abundant crop of wheat is obtained. The same material is also used in the cultivation of the hop; and it is said that, administered in small quantity to the roots of the bine, they preserve the plant from the attacks of destructive insects.

Coal Ashes.—Coal, like the two last combustible materials, is the product of vegetables, which, however, have undergone such a change as to have lost almost every trace of organization. Coal of different kinds contains from 1.4 to about 2.3 per cent. of ashes, and about two per cent. of azote. The ash of a variety of coal of very excellent quality gave of—

Argillaceous matter (silica?), not soluble in acids	62
Alumina	5
Lime	6
Magnesia	8
Oxide of manganese	3
Oxide and sulphuret of iron	16
	100

Coal ash also contains very minute quantities of alkaline salts, which usually escape analysis when they are not especially inquired after. One specimen analyzed in my laboratory gave nearly 00.1 of alkali. Coal ash is particularly useful on clayey soils; it acts by lessening the tenacity of the soil; and farther, doubtless, by the introduction of certain useful principles, such as lime and alkaline salts.—Law's Translation of Boussingault's Work on Rural Economy.

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[*] Our author might have added the fact, that the common bog iron ore of this country is a phosphate of iron.—Eng. Ed.

ON MALT, AS A FOOD FOR LIVE STOCK.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

In the course of the contest, which has now only commenced, with regard to the proposed repeal of the Malt Tax, it is very desirable that the farmer should have before him all the information that has been collected with regard to the *chemistry* of the question. Whatever may be the fate of the effort—whatever experiments may be adduced on either side to prove the superior value of malt to barley in the feeding of stock, it cannot but conduce to a clearer understanding of the question, if we inquire into the nature of the chemical changes produced when barley is converted into malt. Let us therefore endeavour to follow as closely as we can the chemical operation performed by the maltster. The first operation—that of steeping the barley—is not commonly understood. This "wetting" not only causes it to swell; but the steep-water extracts a considerable quantity of matter from the grain; so much so that the solution often becomes of a dark colour. Now, the portion of the barley thus extracted, when recently examined by Professor J. F. Johnston with great care, was found to consist of various substances (*Trans. High. Soc.*, 1846, *p.* 195). He observes—" I obtained from a maltster in Edinburgh a portion of the water of the first steeping, in the state in which it is usually run off into the drain, in order that I might be able to answer a question put to me by some of my correspondents—Is this water capable of any useful application as a manure?"

When evaporated to dryness, this steep-water left a solid residue equal to 413.6 grains from an imperial gallon. These consisted of

Organic matter—gum, sugar, &c.	166.40
Alkalis and alkaline, sulphates and chlorides	198.84
Phosphoric acid, in the state of alkaline phosphates	8.52
Phosphates of lime and magnesia	23.20
Carbonate of lime	15.36
Loss	1.28
	413.6

The Professor's object not being the examination of malt or barley steep-water as a *food* for animals, but as a *manure* for vegetables, he goes on to remark—" It thus appears that this steep-water contains much valuable matter of a kind likely to promote the growth of plants: the organic matter is capable of supplying organic food; the inorganic matter, alkaline salts, and phosphates in a state in which they can readily make their way into the roots of plants. It ought not, therefore, to be allowed to run to waste wherever convenience exists for readily applying it to the land."

From the results of this analysis, therefore, it is evident that so far from the action of the steep-water *adding* any feeding properties to the barley, it subtracts from it a considerable portion of nutritious substances. What, then, is the chemical change produced upon barley when converted into malt?—a question which long since engaged the attention of Dr. Thomson. His analysis (published some years since) showed that 100 parts of barley, and the pale malt made from it, contained—

	Barley.	Malt.
Gluten	3	1
Sugar	4	16
Gum	5	14
Starch	88	69

He also examined the entire amount of the loss sustained by the barley in the process of malting (and these results, it is as well to note, were obtained by Dr. Thomson many years before any of his family were employed by Boards of Excise, in experiments to prove that malt had no superiority over barley in the feeding of cattle.) "Barley," observes Dr. Thomson (*System of Chem.* v. 4, p. 368), " by being converted into malt, generally increases two or three per cent. in bulk, and loses, on an average, about a fifth of its weight, or 20 per cent. But of these 20 parts, 12 are to be ascribed to kiln-drying, and consist of water which the barley would have lost had it been exposed to the same temperature; so that the real loss does not exceed eight per cent. From a good many trials, made with as much attention to all the circumstances as possible, the following seems to be the way of accounting for this loss.

Carried off by the steep-water	1.5
Dissipated in the floor	3.0
Roots separated by cleaning	3.0
Waste	0.5

The farmer will find these results not materially different from those obtained by Dr. Thomas Thomson and Dr. R. D. Thomson, in their recent able and elaborate researches, which have been printed by an order of the House of Commons, in the April of the present year. The chemical facts dispersed throughout these observations upon the effect of the process of malting are very valuable, although we may reasonably doubt the correctness of their practical application in their fullest extent, or the results which these learned chemists obtained from cow-feeding and bullock-fattening. They say very correctly (*Report*, p. 87), that their analyses afford some information in reference to the process of malting, and to the change which the barley undergoes by this operation. One of the most striking alterations produced in the barley by its being steeped in cold water for forty hours and upwards, is to diminish its weight. Equal volumes or measures of barley and malt were found respectively to weigh 424 and 325 grains. This would give us 100 parts by weight of barley, equivalent to 76.65 of malt; but as barley expands slightly, or increases in bulk by steeping and conversion into malt, the difference between the two conditions is scarcely considerable. In three returns, obtained by us from maltsters, we are informed by the first maltster that 27 cwt. of barley becomes 22½ of malt, or equivalent to 100 of barley and 83⅓ malt; by the second reporter, that a bushel of barley weighing 55 lbs. becomes from 43 to 45 lbs. when malted, or equal to 100 barley, and from 78.2 to 82 lbs. of malt; and by the third maltster, that a bushel of barley weighing 55 lbs. becomes 43 lbs. when malted, or as 100 to 78.2.

The mean of these three reports indicates a loss which the barley sustains by malting, of nineteen per cent. and upwards; or the loss might be taken approximately at twenty per cent., or one-fifth. The whole of this loss is not, however, solid matter; for, according to our trials, barley, when not crushed, contains 13.1 per cent. of water, and malt in the same condition 7.06 per cent. of water, capable of being dissipated at a temperature of 212°. Hence, of the 19 per cent. of loss sustained by the barley in malting, 6 per cent. is water. There thus remains, therefore, only 13 per cent. to be ascribed to solid loss.

The quantity of saline matter removed from the barley is considerable. A mean of several trials gives for the ash of barley 3 per cent., and for that of malt 2.52 per cent. Now, as 100 barley are equal to 80 malt, the quantity of ash which malt should contain is 2.42, if the loss of organic and inorganic matter were equable, which we observe it to be, almost approximately, from this experiment; for the relation of the ash which has disappeared, or 0.48 per cent., bears almost the same relation to the organic matter also removed as the total quantity of ash in barley does to the total organic matter of that grain. Thus barley contains 84 per cent. of dry organic matter, and 3 per cent. of ash; while malt has lost 0.48 per cent. of ash, and 12.52 of organic matter; and by calculation we have—

$$\text{As } 3 : 0.48 :: 84 : 13.4$$

a remarkable coincidence, as if proving that water is incapable of removing the ash of plants until the organic matter has undergone such a change as to allow the ash to separate. We have thus an argument in favour of the subsistence of a chemical union between the inorganic and the organic matter of which the substance of farinaceous grain is composed. Should this view be well founded, we might expect that the amount of ash in grain would bear a constant ratio to the dry organic matter by weight, in whatever soil it might be grown. It would also follow that cold water will not take up saline matter from an entire seed, simply by washing or slight digestion. The loss sustained then, by barley in malting may be stated as follows:—

Water	6.00
Saline matter	0.48
Organic matter	12.52
	19.00

The nature of the saline matter removed from the barley is exhibited in the analysis of the steep-water ash, although it is not so easy to explain the source of some of the constituents. The following is the result of Dr. Thomson's analyses of the solid or saline matters of steep-water of barley:

Silica	2.32
Phosphoric acid	6.22
Sulphuric acid	5.00
Chlorine	1.99
Carbonic acid	9.09
Peroxide of iron	0.72
Lime	3.95
Magnesia	4.26
Potash	29.74
Soda	23.60
Organic matter and water	13.11

100 grains of the salt, dried at 212°, afforded .878 of nitrogen, which is equivalent to 5.48 per cent. of albumen.

We observe from this analysis that silica has been removed from the barley. That this substance is united with potash is obvious from the gelatinization which occurs when hydro-chloric acid is added to the steep-salt. The origin of the carbonic acid, or rather its condition of union, is not so apparent. It might be attributed to the impurity of the water; but the presence of a minute amount only of lime opposes this explanation. The water used in the steep was the Clyde water, which contains chalk in solution, and sulphate of lime. To this source the sulphuric acid may owe its presence.

"The richness of the steep-water in alkaline salts," continues Dr. Thomson, "suggests its employment as a manure. A considerable part of the organic matter of the barley is dissipated in the form of carbonic acid; but a large portion of the albumen and sugar is also dissolved in the water, the solution of the albuminous matter being probably assisted by the action of the phosphates, which are capable of dissolving, it is well known, some of its forms, more particularly casein (curd). The quantity of nitrogen obtained from the steep salt when evaporated and dried at 212° was very considerable, being equivalent to five and a half per cent. of albumen, if the whole of the nitrogenous matter existed in the form of that principle; but besides this substance there was also present a large quantity of other organic matter in the steep-solution, since the steep-salt when dried at 212°, and then ignited, lost upwards of 40 per cent. of its weight.

Having thus carefully examined the composition of the steep-water of barley, the next important branch of the inquiry is to determine the chemical difference in the composition of barley in its natural state, and of the same barley when converted into malt. Now, this very point engaged Dr. Thomson's attention: he found in 100 parts of barley in its natural state, and when dried at 212°—

	Natural state.	Dried.
Carbon	41.64	46.11
Hydrogen	6.02	6.65
Nitrogen	1.81	2.01
Oxygen	37.66	41.06
Ash	3.41	4.17
Water	9.46	

Malt from the same barley contained, when in its natural state, and when dried for some days in a heat of 212°—

	Natural state.	Dried.
Carbon	42.44	43.93
Hydrogen	6.64	7.00
Nitrogen	1.11	1.29
Oxygen	43.08	46.51
Ash	1.68	1.27

From these results, and from the rule found to be correct generally speaking, that the power possessed by food of sustaining the animal system depends, in relation to their ultimate composition, upon the amount of carbon and nitrogen which they contain, I hardly see how Dr. Thomson could avoid the conclusion to which he has arrived, after all his laborious researches and mass of experiments, which he thus sums up :— The views which we have been discussing, of the difference in chemical composition of barley and malt, are sufficient to render it obvious that malt is a much more expensive substance irrespective of duty, than barley, for feeding, inasmuch as it is in reality barley deprived of a certain portion of its nutritive matter, and salts. The only advantages which it seems to hold out in cattle feeding is the relish which it gives to a mash; but as this depends entirely upon the sugar which it contains, and which has been produced from the starch of the barley, it is obvious that the same flavour may be imparted by the addition of an equivalent amount of molasses or sugar, should it be considered expedient. But we have always found steeped barley to be highly relished by cattle. Malt, however, from the diastase it contains, has the power of speedily converting the starch of barley into sugar; a handful of malt would be sufficient to saccharize several pounds of barley in the steep."

In the truth of these important conclusions, it may be well to remember, both Dr. Lyon Playfair and Professor Liebig concur.

There is important evidence on the other side of the question, however, which may, perhaps, lead us to the conclusion that although the great chemists whose labours we have been examining may be *scientifically* correct, yet that *practically* the results of the farmer's experience tends to a very different conclusion. By reference to the experiment of Mr. John Hudson, of Castle Acre (*ante* p. 16),, it will be seen that he found in some comparative trials with six bullocks, from March 25th to July 1, that the malt-fed beasts produced a greater profit by more than six pounds than those fed with barley. It seems, too, that the malt-produced beef was of a finer grain, and of a better quality. It seems certain, also, whichever way it is explained, that, as Mr. Hudson said before the committee of the House of Lords (*ibid*, p. 115), malted barley is an excellent article for the purposes of fattening animals; and he added that he considered for this purpose five quarters of barley equal to a ton of linseed cake. He was of opinion, too, that five quarters of malt are equal to seven quarters of barley. He was most clear in his views and decided in his opinion; for although well aware that practice and theory differed on this question, he was willing to support his opinion against the great chemist by a bet of £100. He would back fifty or a hundred bullocks fattened upon malt, against fifty or a hundred bullocks fattened upon barley either wetted or ground, and that, too, in the proportion of five to seven; in fact, he should not object that the chemist should take seven quarters, and himself five. The meat, too, produced from malt, as he explained to the committee, is much superior to that produced from oil cake; far better for the consumer, less oily, "it does not go so much into the dripping pan."

It is difficult to suppose that by the conversion of the starch of the barley into sugar, by the process of malting, its fattening properties are not increased. In the examination of different kinds of vegetable food, from rice (which is nearly all starch) to those which abound in sugar, the superiority of the sugar-containing varieties is very evident; for instance, in the vegetable food of the farm we find in 1000 parts of

Red beet	121	parts of sugar
White beet	119	,,
Carrots	95	,,
Parsnip	90	,,
Swedish turnip	51	,,
Common turnip	34	,,
Cabbage	24	,,
Potatoes	15 to 20	,,

With regard to sugar, Sir H. Davy said (*Elements Ag. Chem.*, 81), "The nutritive properties of sugar are well known: experiments have been made which prove that cattle may be fattened with it, but difficulties connected with the duties laid on sugars have hitherto prevented the plan from being tried to any extent."

Many experiments have been adduced in favour of the fattening properties of sugar. In the communication to the Board of Agriculture, v. 6, p. 43, Mr. Waters attests the value of molasses as food for fattening oxen, which he considered preferable to any other artificial food. And it is well known that the sugar planters of the West Indies fatten their cattle on the refuse matters of the sugar cane; and that even their negroes were used to get fat in crop time.

On the whole, I cannot but regard the question as one that a few more trials only will be needed, to decide the correct place in which malt should be placed in the list of the farmer's food for live stock. Those who deny the superior power of malt, and those who claim for its fattening properties too high a rank by contending for too much, both produce a result equally opposed to the attainment of truth. That it will be found an excellent agent, in the hands of the practical farmer, to promote the profitable consumption of other food, by increasing the healthy appetite and the goodness of the flesh of the beast, seems pretty certain; and all this may be proved to be profitably compatible with the truth of the chemist's researches, that the simply or directly nutritive ingredients in malt are not greater, but perhaps rather less than the barley from which it is produced.

HEXHAM FARMERS' CLUB,

JUNE 9TH, 1846.

Mr. GREY, the President of the Society, addressed the Meeting on the subject of "Thorough Draining," to the following effect:—

Gentlemen,—I regret that I should have been so much occupied up to this moment as to have had no opportunity of making any arrangement of the subject on which I am expected to address you. I must, therefore, bespeak your indulgence, if what I may say should be found to be, as it doubtless will, less correct and concise than if it had been prepared and written down, as has been the laudable custom with those gentlemen who have introduced other subjects for discussion at your meetings. Most of the agriculturists are now so well acquainted with tile draining, that it is probable much which I shall say may be already familiar to you; but if, from the experience which I have had in the matter, I should have made observations which some of you have not made, or come to conclusions different from yours, there may be some use in bringing such observations and conclusions under discussion; for, in my opinion, the information which is elicited by after discussion in such meetings as this, is frequently more important than that which is derived from any single address. First, then, allow me to make a few remarks on the utility of draining land thoroughly. So much of the land in this county lies on a retentive subsoil, causing in it a great degree of humidity and coldness, that the portion which is naturally so dry and open as not to be improved by draining, is the exception to the general rule. To obtain good crops from such land is always a matter of uncertainty. A wet spring delays the sowing to a late period; or if the weather be tempting for sowing, and storms of rain or snow should interrupt the operation—as was the case this year—such land has small chance to recover the injury it sustains during the remainder of the season. But admitting the seed-time to be good, and the crop to a certain period to be flourishing, a fortnight of wet and cold weather any time during the summer cuts down the fair prospect, and leaves a thin and unproductive crop for the harvest. Such was the case, many of you will remember, in the high and cold districts of this county four or five years ago: up to the end of June the crop was most promising; a succession of heavy rains then came on; the ground was saturated with wet; the corn became yellow, and by degrees thinner and thinner, till, ere harvest, the crop consisted more of thistles and weeds than grain. Against such contingencies thorough draining is the only security; by means of it an earlier seed time, as well as an earlier harvest, is obtained; the average produce of the land is greatly increased, in many cases it is doubled; and the expense of working it is immensely lessened. Every one, accustomed to cultivate heavy and undrained soils, knows the injury which his fallow sustains by one ploughing before it is sufficiently dry, or by a heavy fall of rain directly after ploughing, and how much labour is required to recover it from that injury, if it can be done at all, during that season. When, then, I hear tenants remark upon the expense of bringing tiles to drain a field, I tell them to think of the future labour which the dryness, and consequent friability of the soil after draining, will save them—more, perhaps, in one year of fallow than all the carting of tiles, with the certainty of a much better crop to boot. So far I have alluded to corn crops, but in our days the root crops have grown into an importance almost greater than those of corn, especially on soils of inferior quality. It becomes, then, a great desideratum to substitute turnips for naked fallows in all possible cases; and this, thorough draining enables us in a great measure to do. I have seen a field, which previous to draining never was thought capable of growing turnips, produce a crop the year after being drained, which was sold, for eating on the land, at 6*l.* per acre; and the produce of the barley crop in the succeeding year was double of what it had ever been known to grow before; thus returning the entire cost of draining in those two seasons. But on land less unfavourable, and on which turnips have hitherto been cultivated, though at great risk from wet seasons, the advantage of draining is found in its easier and earlier cultivation, in the greater certainty of its produce, the ease and comparatively small injury which attends the removal of the crop from the field, and the increased benefit derived both by the land and stock if consumed on the ground. Every one knows how much better sheep thrive on dry than damp land, and how much less waste of food is occasioned. But it is not to tillage lands only that the benefit of draining is confined. I know a rough ox pasture for which an allowance for draining was made by the landlord, but which did not finish the job, and a part is left yet undone by the tenant. The part which was first drained comes earlier, and affords a full bite to cattle three or four weeks sooner than the other, and is, besides, so much sweeter and more nutritious that they are constantly upon it, and never upon the other till necessity compels them. By abstracting the water the coarse and aquatic plants are destroyed, and again succeeded by grasses of finer quality and earlier growth, by which means the value of the pasture is much increased. The beneficial effects of rain in promoting vegetation are too well known and too obvious to require remark: every shower conveys a portion of ammonia from the atmosphere to the earth, and communicates a fertilizing property. It is only when the land is saturated with it, and when, instead of passing through, it remains in it till abstracted by evaporation, that it becomes pernicious. The most intense cold is produced by a process of evaporation; and if water, falling upon land with a retentive subsoil, is left till it be removed by that means, which in winter is very slow, the earth is starved, and the plants it contains frequently perish, or, as is the case with wheat, lose their hold, and are thrown out by frost. By draining thoroughly we make the rain our friend and not our enemy, we take all the benefit and avoid the injury. It is not, however, only during winter that superabundant moisture in the land is pernicious, its effects are equally injurious in the drought of summer: we see the strong soils, which in winter were saturated with water, in the drought of summer become hard, impervious, and unmanageable, cracked it may be with large fissures, but baked together so as to exclude all the beneficial influences of the atmosphere. The same effect is produced in hard frost: let any man attempt to push his walking-stick into such land at such a time, and he finds it bound in a coat of iron, while that which had been rendered dry and friable by draining is still loose and pervious. One obvious effect of water lodging in the soil is, the exclusion of air; but as the water is drawn off by draining, the air immediately takes its place, and, intermixing with the particles of soil, communicates to it that divisibility and mellowness to which farmers give the term of "friability." It is from the admission of atmospheric air to a greater depth, charged as it always is with some degree of moisture, that dry and loamy land is found to resist drought better than wet and adhesive clays. [Mr. Grey then went into a curious and interesting dissertation on the principle of atmospheric pressure, showing its effects on all external objects, its tendency to insinuate air into the ground and occupy the place of water, and even aid in expelling it; and illustrated its effects as needful to the human body, by relating a circumstance which occurred to the celebrated travellers Humboldt and Bonpland, who, when taking observations at a great elevation on the Cordillera Mountains, found the air so rarefied as to make breathing painful, and at length to cause the blood to flow from their eyes and ears, the external pressure being no longer equal to counteract the internal impetus of the heart. Apologising for the digression, Mr. G. proceeded]. Having said thus much on the utility of draining, allow me now to make some remarks upon the mode of carrying it into effect. The first thing, and that is of essential importance in setting out drains, is to secure a clear outfall for the water which is to be discharged from them. I have seen much injury and loss sustained by allowing the drainage of a field to be emptied into an open ditch with little declivity, while by negligence in allowing grass and weeds to obstruct its course, the ends of the drains were sanded up and rendered useless; it is much safer to incur the expense of conveying the water in a covered drain till a clear outlet can be found for it. Another thing to be especially avoided, is the laying of tile drains through a hedge, that they may be emptied into a ditch on the opposite side. The roots of trees have a great tendency to insinuate temselves into the cavity of drains, and to run along them to a great extent—the root of the ash is especially pernicious in this way. I have seen drains which had been run across a hedgerow with ash-trees in it, which stopped running, and on taking up the tiles they were found to be filled with the roots of the trees, which were grown over with a hairy looking vegetable substance, resembling a badger's tail, and had entirely stopped the circulation of water, and spoiled the drains for a considerable distance from the fence. But I would not only avoid placing drains in a hedge, I would also keep them in general, and as much as possible, off the headlands, in tillage fields. It is, I see, a common practice to run the carry drain along the headland; my objection to that is, that the headland is travelled upon by corn carts and dung carts, and is turned upon in ploughing, so that drains are in much greater danger of being broken in or disturbed, or so pressed into hollows that sand may filter into them, than when laid across the ends of the ridges two or three yards above the headland furrow. I would also recommend, in draining, that the drains of every field be laid down upon a plan when finished, so that no difficulty may afterwards be found, in case of stoppage or inefficiency, in going directly to the spot. Then, with regard to the depth of drains—a subject of much discussion and controversy—I am of opinion, and that opinion has not been formed without much observation, that we have wasted a good deal of money and great many tiles by laying them too near the surface. The tendency of water is downward; and the nearer its downward course approaches to the perpendicular, the quicker will be its escape. It follows, then, that it will find its way more quickly to a drain of three or four feet deep than two. And, in fact, in the case of drains only twenty inches or two feet deep and twenty feet apart, the water from the middle of the interval must have a course so nearly horizontal as to be very slow in its progress, and to expose the land to wetness for a considerable time. The theory of deep drains is this, that by abstracting the water and admitting air instead, the soil, but especially the clay, contracts to the depth at which the water is drawn off, and in contracting, many small fissures or veins are formed, which serve as channels for the water to reach the bottom of the drain. To leave theory, however, as we are all practical people here, I will tell you what I have myself seen: a field had been drained at the depth of two feet from one side to the other, still it did not produce the effect of drying the land so quickly as had been expected; the owner had a few drains cut here and there at a depth of four feet: after a heavy rain, I, along with others, went to examine the field; we found a small run of muddy water from some of the shallow drains, but a copious one of clear water from all the deeper ones, showing that in its descent to them it had not robbed the soil of any of its finest parts, as was the case in the shallow drains, and that it was escaping much faster from the land. You will find it also recorded, from most authentic information, in the Journals of the Agricultural Society, that the water drawn from an acre of land in an hour, drained at a depth of four feet, was one-third more than from another adjoining acre with two feet drains, and that the run began sooner, after the fall of rain, in the deeper drains, and of course also ceased sooner, than in the shallow ones. My own opinion is, that in hardly any case should tiles be laid at a less depth than three feet, but that in many cases four feet would be preferable. The expense should be estimated more by the efficiency of the operation than the outlay of money; but even in respect of expense the balance is in favour of the deeper draining; for if drains three feet deep and thirty feet apart are more efficacious than those of two feet deep and twenty feet apart, the former comes cheaper by the acre, as there is only one foot more of soil to remove in the deeper drains than in the shallower, against which is to be set the saving in the purchase and carting of one-third of the tiles. It is, of course, impossible that one rule can be applicable to all situations. Much must be left in every case to the kind of subsoil which is met with—in some places seams of sand are found intersecting beds of clay, and then probably one deep drain may lay a whole acre dry better than many shallow ones would. There is one description of subsoil common in this county, in which I think it may be advisable to make the drains frequent and shallow, rather than deep and more distant, because it is so firm and hard that I believe no cracking or contraction will take place in it, so as to allow water to descend; on which account the best way probably is just to dig through the soil, and lay the tile into a grove cut in the subsoil. This subsoil we call "moorband," in other parts it is called "pan," and is a concretion of gravel and clay with oxide of iron, so hard that it is scarcely possible to break it up.* One thing I have omitted to remark, and that is, that in making drains it is desirable that they should be done, as much as may be, in the spring or in dry weather. When bottomed out, care being always taken to lay the tiles or pipes level, and directly opposite each other, let them be covered just so much with clay, taken from the bottom of the drain, as to keep them safe, and then leave the drains open for as long a time as may be convenient for working the land, because the volume of air which in this way has access to the drain is so much greater than that which can pass through the tile or pipe, that the contraction of the soil or clay takes place more rapidly, and the drains come so much sooner into full action. Then, as to the tile or pipe which it is advisable to use: for a long time we used tiles of unnecessary size, and in many situations those tiles could not be used with safety without soles, which became very expensive. Of late years pipes have been substituted for tiles, and are, I think, in every respect deserving a preference; I prefer them because they are safer against stoppage, stronger, more durable, and more economical. The circular shape is that which in all sewers and carries of water is found to be least liable to be stopped up, because the current is always deepest and strongest in the centre, into which every substance that comes must fall and be carried off: whereas a flat bottom admits of deposits and accumulations which the shallow current cannot always remove. Pipes are less apt to be sanded up on this account than tiles, in flat ground; and on steep hill sides they are safer, as, when once fixed, the current cannot displace or undermine them. They are stronger of necessity, by the equal pressure upon the circle, which any one may prove for himself. I lately broke several tiles with my

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* ANALYSIS OF MOORBAND.

From Flodden Field.	Parts.	From Milfield Plain.	Parts.
Oxide of iron	34	Oxide of iron	43
Silex	74	Silex	64
Alumina (clay)	6	Alumina	8
Water and loss	6	Water and loss	5
	120		120

hands at a tile-kiln, while I stood and jumped upon pipes of the same clay without effect; and they are more economical, because they are cheaper to purchase; and a cart carries a much greater number. It is objected to pipes that they may roll aside when laid in the drain, and the end of one may not be exactly opposite the end of the next; but then it may be objected that careless workmen may spoil any job, and unquestionably all kinds of draining require attention and nicety in the execution. Admitting this as an objection however, I think it is fully obviated by the kind of pipe now made at Whittonstall and at other places in this district, which, while it preserves the circular form for the water, is attached to a flat bottom, which keeps its place in the drain as steadily as anything of the kind can do—a specimen of which I expected to have found here, but it has not made its way into the room. Such pipes, of various bores, can be made at from 16s. to 20s. a thousand.

I think, gentlemen, I have now noticed most of the points which are important in connection with this highly interesting subject, a subject which is now occupying much capital, and giving employment to a multitude of hands in the agricultural districts, and which is destined, I believe, to render the produce of our soil much more certain than heretofore, and greatly to increase its average annual amount. There is yet one thing in connection with draining, and especially when it is accompanied by subsoil ploughing, which perhaps you will allow me to advert to, and that is the depth to which plants will send their roots in search of nourishment, if not impeded by impervious subsoils, and by water, which is pernicious to them. I recollect to have seen in Bamburgh Castle some stalks of wheat which were placed there, I believe by the late Lord Barrington, whose roots had penetrated to upwards of eight feet below the surface of the ground; they had been got, I think, by breaking in the edge of a quarry near which the wheat was growing, and which had found means to penetrate its open soil. The extent to which the fern pushes its roots, far exceeding the height of its stem, may have been remarked by most of you on a steep bank, or by the side of a brook; we find the roots of trees, too, pushing outwards into the soil, to the great obstruction of the plough, as far as their tops rise into the air. If, then, this be the natural tendency of plants, there can be no doubt that in proportion as we draw off the stagnant water by deep draining, and make the land permeable to atmospheric influence, and accessible to the roots of plants, in the like proportion shall we increase its productive powers; while by lessening the evaporation, and ridding the earth of noxious vapours, we shall contribute materially to the warmth, dryness, and salubrity of our atmosphere. I now beg to thank you, gentlemen, for the very attentive hearing with which you have favoured me, in an address which may have appeared to you rather desultory, and if any one has objections to make to my statements, or explanations to ask for, I shall be most ready to attend to him.

A question was asked by Mr. STEPHENSON as to the size of pipes which Mr. Grey deemed sufficient to contain the water from drains thirty to thirty-three feet apart.

Mr. GREY: I consider pipes of one inch diameter generally sufficient, more indeed than ever will be filled. Look at the quantity of water vented by a lead pipe of much smaller dimensions in your stable-yard. But it is an object to admit air as well as to convey water, and therefore I am not strenuous for very small pipes—that is more a question of economy. If your drains are, say 300 yards long, begin with one-inch pipes for 100 yards, then take one inch and a-quarter, and so go on increasing as you approach the outlet; and your carry-drain may be made of a single large pipe, or of three smaller ones, two side by side, and one above them, which makes a safe and excellent main drain, the top pipe, however, being seldom needed.

Mr. SMITH inquired if Mr. Grey would recommend to put small stones over the pipes, or straw, or any other substance.

Mr. GREY said the object was to draw the water, not along the surface and down into the top of the drain, but by a downward fall through the soil into the bottom of the drain, when it would insinuate itself into the joints of the tiles or pipes; he therefore considered that the firmest stuff was best for the top of the pipe. He disliked to see straw carried out for that purpose, because it robbed the fold-yard and the dung-heap, and did, as he thought, no good. He had had occasion to drain a good deal of thin moorish land, where it was necessary to cut through a sharp yellow sand: he had laid heather, which is a very imperishable article, on the tiles in that case, to prevent the sand from being washed into them.

Another question was then asked as to the direction in which drains ought to be laid, whether directly upwards or in a slanting direction.

Mr. GREY replied, that he considered all drains ought to be laid perpendicularly and at right angles to the incline; for in that way the strata, as they crop out, are cut through, and the water they contain is immediately discharged into the drains; whereas in the old way of laying the drains obliquely they frequently ran along in beds of clay, drying only a yard or two in their immediate vicinity, but without abstracting the water, which was proving injurious to the land.

Some further discussion took place among several members, when Mr. **Grey** stated that having an engagement at some distance within two hours, he must take leave of them.

A vote of thanks to Mr. Grey was then proposed by Mr. Trotter, seconded by Mr. Lee, and adopted by acclamation.

After the chairman's departure it was unanimously resolved, that a deputation should wait upon him with a request that he would allow his address to be printed and circulated among the members of the club, subject to his revision and correction, for which purpose the notes taken by the secretary and others were placed in his hands.

REPORT ON THE WHEAT SELECTED FOR TRIAL AT SOUTHAMPTON, AND ON OTHER WHEATS.

BY W. MILES, M.P.

Having been requested to prove by trial the value of the wheat selected by the judges at Southampton, I beg to submit to the Council the following report.

The different sorts I determined to try against the prize wheat were four—namely, Jonas's prolific seedling, the red-straw white, the Hopetown, and Fenton. The first of these I had grown every year since carrying out the wheat experiment for the Society in 1841, with uniform success, and without going from home for change of seed. The second I procured from Mr. Morton, who has for some time grown it at the Example Farm, and who speaks highly of its character. The third I obtained from Mr. Sheriff, who himself raised it from a seedling. This sort is more generally known throughout the country than the two former, and is much prized: whilst, from the recommendation of Mr. Sheriff, I applied to Mr. Hope, of Fenton Barns, Haddington, for the fourth sort, which had been raised from a seedling discovered by Mr. Hope, senior, in a stone-quarry. This wheat is already celebrated in Scotland for its wonderful produce. It grows very uneven, many stalks not rising above three feet from the ground, whilst others attain four, five, or more. Of this wheat I received the subjoined notice from Mr. Hope:—

"As I understand you are to sow it by way of trial against the prize wheat of the Royal Agricultural Society, I may give you a short history of it. A number of years ago it was observed growing in an old quarry by my father, who was struck with the stiffness of the straw. There were three heads from one stem, which were properly saved and propagated. It is quite a distinct variety from anything known in this quarter. The straw is shorter than most kinds, but remarkably stiff, and weighing per acre as heavy as taller sorts, while the increase of grain grown is generally equal to the rent of the land. A person unacquainted with it would scarcely expect this when looking at it growing, the heads being unequal, some of them being two feet higher than others."

The field which I chose for carrying out the experiment was on the side of a hill, facing N.N.W.; the character of the soil a rich loam, inclining in some places to marl, of considerable depth, except on the summit of the slope, where it was stony. It was a one-year-old clover ley, which had been once mown, and afterwards fed by sheep. The controversy between the merits of thick and thin sowing having been carried on at considerable length between the advocates of the different systems, as perfectly unprejudiced in favour of either, I determined to try both; and Lord Ducie having undertaken the management of Newberry's dibbling-machine, an opportunity was offered of putting in a small quantity of seed with the best-constructed implement of the kind. Previously to making use of the machine, however, it was tested in a grass-field, when it was found that it deposited in each hole made by the dibbles from two to six grains, rarely, if ever, exceeding the last number. Several agricultural friends were present at the working of the implement; and as a wish was expressed that the smallest quantity of seed per acre which the dibbling-machine could deposit should be sown, it was set at two pecks per acre. I think, however, that it would not be out of place here to state that the system of thin sowing is by no means a novelty; and that if the late Lord Leicester considered three bushels of seed per acre as necessary to insure a good crop of wheat, there were others who thought that a tenth, or even less than that quantity, would lead to a similar result; whilst, no doubt, the saving of wheat consequent upon such a reduction of seed used could not be considered but of national importance. I met lately with a work upon agriculture, written by C. Venlo, and published at Winchester in 1773, from which, even at the risk of being tedious, I cannot resist giving an extract, as the writer appears to have been a thoroughly experienced agriculturist, and in practical and theoretical knowledge considerably advanced beyond the agriculturists of that period.

In 1764 the author instituted an experiment to find out the true distance or quantity of land that wheat ought to have to grow upon. In his own language, it appears that he had invented a machine which harrowed, sowed, and rolled at the same time; and which, as it would sow any quantity of grain on an acre the broad-cast way, the author made a trial of sowing wheat thin on the ground. He accordingly fixed upon a field of 15 acres, which had three different sorts of land in the length of the ridge, which was 40 perches long. "One end of the field lay low; the soil was a strong loamy clay. The middle was a high hill; the soil at top was a kind of clay-gravel, very shallow, and mixed with a middle-sized paving-stone. The other end was not so low as the first, neither was it so strong a clay, but was what we call a loamy sand: upon the whole, it was very good wheat earth; but the bottom of the field was rather more so. The top of the hill was more proper for barley than wheat. The field had been fallowed for two years, in which time it had got only seven ploughings, which—if I had had the management earlier, as I had not—should have been at least twice as many. Upon the whole, it was in good order, and by far a better fallow than the common run. I gave it a thin top-dressing of wet turf-ashes (for I had no other), and harrowed them in with the seed. On the 15th of February I sowed 14-oz. on one ridge, which, according to the measurement of the ridge, was at the rate of 10-lbs. to the acre; on the other ridge I sowed 28-oz., which, according to measurement, was at the rate of 20-lbs. to the acre. The ground was very wet, and the horses sunk as far as the plough went. However, the seed was not trod in, because it was sown between the harrow and the horses' feet; but the harrow could not come over it the second time without making the ground in mortar, so that it was only harrowed once in a place: therefore I am clear more than half the seed lay bare and uncovered; but as the ground and the weather was wet, it soon vegetated, and most of it grew."

The author then enters into his theory of the shooting of wheat, and states "that in rich, clean, good, well-tilled land, a plant of wheat may shoot to fill 18 inches square; yet I chose to fix my standard to 1 foot square in good land, as that will bring forth to maturity from 20 to 30 ears, which I found to be as many as had sufficient room to grow out of one sort. As to the ridge which was sown at the rate of 20-lbs. to the acre, it was impossible to find a root with above 17 ears at it in the best part of the land, and so in proportion in other parts. This was the most convincing thing of all to the reapers and by-standers, who were all helping to seek; and they found more on the thin-sown ridge, at 30 ears and upwards on one sort, than on the other ridge at 17 ears to the root." "The crop was late before it was ready to reap: it was the latter end of October. It happened to be a fine dry time, or it is a doubt to me, if it had been wet, if it would have ripened well at all, for it was sown too late, and was still put back by having to branch out. No 'pickle' used: and I had from the piece of ground sown with 10-lbs. of wheat, 53-stone 5-lbs. of the finest wheat I ever saw. Every sheaf yielded a stone or upwards; but the sheaves were made large. The produce was at the rate of 32 bushels per acre."

Upon further search I discovered a plate in this work, which might be the original from which Newberry's dibbling-machine was formed. From this drawing, and from the information given in the description of it, it appears to have either simply acted as a dibbling-machine, or to have performed the double office of dibbling and sowing.

Begging pardon for this digression—which, however, I do not think will be uninteresting to some of the readers of this report—I now proceed with my details.

Four different quantities of seed were used per acre, viz.—in the drilled wheats, 2 bushels, and 1 bushel and 3 pecks; in the dibbled wheats, 2 pecks, and 2 pecks and 1 quart—the addition of the 1 quart of seed to the dibbled portion of the wheat was consequent upon the unfavourable state of the weather at the time the seed was deposited.

The wheats were put in as follows:—

1. Jonas's prolific seedling.
2. Red-straw white.
3. Hopetown.
4. The Southampton, called the Brittany, or Breedon white wheat.
5. Fenton.

On Tuesday, the 5th of November, all the wheats were drilled in except the Fenton, which had not arrived from Scotland. On the Friday following we began using the dibbling-machine. Much rain fell during the day, and all that night, so that the ground was in a very indifferent state for working the machine; the draught was great, and against the hill it was as much as four good horses could do. The machine, however, though far from perfect, seemed to deposit the seed tolerably regular; but the land carried so much, that even with the recent improvements there was some difficulty in clearing the dibbles of the soil, which at every revolution adhered to them.

The Fenton wheat having arrived on Friday, the drilling and dibbling were finished on Saturday morning. An acre was allotted to each of the drilled, half an acre to each of the dibbled wheats. On the 16th I find the first drilled wheats were up, and the Fenton and dibbled wheats were germinating. On Friday, December 6th, the thermometer stood 10° below the freezing point. On the 21st the frost began breaking up, with cold winds from the N.N.E. and E.S.E., when the dibbled and late drilled wheats were considered in a critical state, not having arrived at a full green blade: little or no damage, however, occurred. In February the dibbled wheat, though very thin, still very clearly indicated the different rows; but towards the latter end of March we had sharp frosts and biting winds, when on the lighter land on the hill many plants perished; and then it was that the thick sowing showed to advantage, as, from the paucity of plants in the dibbled wheats, none were left to make good the deficiency caused by the inclemency of the weather at that particular time when the wheat is most susceptible of injury from climate; whilst, in the drilled wheats, though many plants perished, yet was there a sufficiency left to insure a crop: indeed, under the most favourable circumstances of the atmosphere for the growth of wheat, I could never recommend so small a quantity of grain to be sown as that I experimented upon, without the precaution of a seed-bed being adopted, from which the grower might be enabled to fill up the vacancies occasioned by numerous accidents. Immediately the frost broke up, a very heavy roller was passed over the ground. I hoed the whole of the field once, as in this trial I considered it necessary that the whole of the wheats should be subjected to the same treatment so that the simple inquiry—upon the results of the crop being ascertained—might be "Which system paid best?" The one hoeing with the drilled wheats proved sufficient to ensure me a good clean stubble; whilst, owing to the paucity of plants in the dibbled portion of the field, the filth was excessive, which will occasion at least double labour in preparing it for the root-crop next season. On the 5th of April I noted that in appearance Nos. 1, 2, and 3 stood first, without any perceptible difference in superiority; No. 5, second; No. 4, third: indeed, throughout the winter the latter wheat appeared more delicate in habit, and was thinner on the ground, and had lost more plants than the others. The dibbled wheats were regarded as a failure, as there was not supposed to be sufficient plant to insure a crop. No. 1, drilled with 1 bushel and 3 pecks, will do. From an accident which occurred to me, I was not enabled to attend to the progress of the experiment as well as I could have wished; but three friends reported to me on the 22nd of June that the plants on the dibbled part were looking much stronger than those on the drilled, although thin on the ground; and that the whole field was looking exceedingly well, although Nos. 1, 2, and 3 still maintained their superiority. On July 26th I found, upon careful examination, the wheats, with the exception of some trifling rust, were looking well; and, by a very good agriculturist, who accompanied me in the survey, the produce of the wheats was estimated at—

Drilled.	Dibbled.
No. 1. 41 bush. per acre.	No. 2. 36 bush. per acre.
2. 41½ ,,	3. 34 ,,
3. 43½ ,,	4. 30 ,,
4. 41 ,,	5. 37½ ,,
5. 42 ,,	

At this time No. 1 was much laid, as well as a small part of No. 2: all the others stood well. From the 2nd to the 11th of August we had heavy and continuous rains, at which time No. 1 was beaten flat; a considerable part of No. 2 was down; No. 3 was not so much affected; whilst Nos. 4 and 5 stood upright. The dibbled wheats were in no way affected by the weather; whilst the wheat drilled at 1 bushel 3 pecks per acre at the lower end of the field, in the deep soil, was prostrate.

From the state of many of the pieces I found it quite impossible, without serious injury to the produce, to mow the crop; and therefore, on the 19th of August, began reaping No. 1, but was interrupted by rain for 24 hours. On the 22nd I finished 1 and 2; on the 23rd, 5; on the 25th, 3 and 4. As there appeared every chance of a catching harvest, on the 29th I housed Nos. 1 and 2 in the barn; but as the weather took up immediately afterwards, I left 3, 4, and 5 till the 2nd of September, when I stacked them in the field. The dibbled wheats were still very green; but from the quantity of small birds which infested the field, it was necessary to cut it, which I did on the 30th of August, and housed all on the 5th of September, on which day the experimental field was cleared of the dibbled wheats, as I conceive prematurely, for they were not in a condition either for the barn or stack; but the weather was so threatening, joined to the havoc committed by the birds, as to determine me to save what I could, without much reference to condition. In my selection of pieces from each of the trial wheats to be thrashed and measured, I took an undeviating line throughout the field, avoiding as much as I could those parts which were much laid; but this was impossible, as far as No. 1 was concerned, as the whole of it was nearly flat. My intention had been to have carried out this experiment as fully as I did that of 1841, and to have reported not only on the quantity of grain and straw produced from each variety, but likewise the quantity of flour produced from a given weight of each. The varying circumstances, however, from the changeable state of the weather under which the different wheats were housed, precluded the possibility of this being fair; and I therefore merely weighed the wheat and straw, the results of which the following table will indicate:—

DRILLED WHEATS.

Quantities sown per Acre.	Numbers of Wheats.	Weight per Bushel.	Produce per Acre, estimated from about one-third of an Acre, measured, reaped by hand, and thrashed by hand. Head.	Tail.	Weight of Straw per Acre.
B. P. Q.		lbs.	B. P. Q.	B. P. Q.	Tons. cwt. qr. lb.
2 0 0	1	60	48 0 0	7 2 0	3 2 2 26
2 0 0	2	59	42 2 0	4 0 0	2 2 0 21
2 0 0	3	61	47 0 0	7 1 0	2 9 2 21
2 0 0	4	60	35 3 0	4 3 0	2 0 0 10
2 0 0	5	62	49 0 0	5 0 0	2 2 2 13
			Estimated from one-fifth of an Acre, treated as above.		
1 3 0	1	59	34 2 0	2 2 0	2 0 3 11

DIBBLED WHEATS.

Quantities sown per Acre.	Numbers of Wheats.	Weight per Bushel.	Produce per Acre, estimated from about one-sixth of an Acre, treated as above. Head.	Tail.	Weight of Straw per Acre.
B. P. Q.		lbs.	B. P. Q.	B. P. Q.	Tons. cwt. qr. lb.
0 2 0	2	58	21 3 2	3 0 2	1 0 2 4
0 2 1	3	58	30 2 0	4 1 0	1 12 3 0
0 2 1	4	59½	19 1 0	2 3 0	0 19 1 14
0 2 1	5	60	34 1 2	6 1 0	1 13 2 11

The Southampton wheat, in this trial, therefore, so far from turning out well, has, both in the drilled and dibbled portions of the field, produced a considerably less quantity of grain than the other sorts. It likewise appeared more delicate in habit; and therefore cannot be recommended for general use.

The Fenton wheat, though when drilled yielding less than either No. 1 or 3, yet when dibbled at 2 pecks 1 quart per acre, produced 5 bushels 3 pecks 2 quarts more than No. 3, and 3 bushels 2 pecks 2 quarts more than No. 1, drilled at 1 bushel 3 pecks per acre; and notwithstanding the severity of the rains and wind after the wheats came in ear, stood perfectly upright at the time of reaping. I cannot but consider this a valuable species; and though not quite on this occasion justifying the very high eulogium pronounced on its merits by Mr. Hope, yet well worthy of general cultivation. Nos. 1 and 3 fully kept up their reputation, whilst in its produce No. 2 was large.

Notwithstanding the dibbling in this trial must be considered, as far as regards Nos. 2 and 4, a failure, yet I cannot but state my thorough conviction, that upon light flat land, free from stones, this system ought to be universally adopted. I should, however, recommend not less than a bushel to be dibbled per acre, and that the process should take place earlier in the season, as when, from the quantity of grain sown, there cannot be a superabundance of plant, it is of great moment that it should be fully established before the alternations of frost and thaw commence. The tillering of the plants is extraordinary, as well as the strength of straw; and what is saved in seed may be most beneficially applied to keeping the land perfectly clean, with advantage to the labourer and certain profit to the cultivator. If, indeed, we take two instances of the same species of corn from the above tabular results, we cannot fail to be struck with the much greater return from the small than from the large quantity sown: for instance, I find that No. 2, drilled at 2 bushels per acre, produced 46 bushels 2 pecks; whilst No. 2, dibbled at 2 pecks per acre, gave, say 25 bushels per acre. Two pecks of seeds, however, were only tried in the latter, whilst four times that quantity was used in the former case; proportionally, therefore, instead of 46 bushels 2 pecks, it should have given 100 bushels. I throw out these hints for serious consideration, as without doubt such a saving of seed as the general introduction of the dibbling-machine would produce must be esteemed of national importance. The machine is too high-priced for the general use of farmers; but when located in different parts of the country, and let out for hire, I cannot but recommend a trial upon the description of light soil to which I have before alluded. W. MILES.

Kingsweston, Nov. 26th, 1845.

REPORT OF PRIZE WHITE WHEAT,

SELECTED AT THE SOUTHAMPTON MEETING OF THE ROYAL AGRICULTURAL SOCIETY, 1844, AND TWO OTHER SORTS SOWN ON THE RIGHT HON. EARL SPENCER'S FARM AT CHAPEL BRAMPTON, NORTHAMPTON.

No. 1. A red wheat, called Rattling Jack, bought of Mr. Redgrave, Boughton, near Northampton.

No. 2. The white prize wheat, from Southampton, 1844.

No. 3. A red wheat, called the Victoria Red, bought of Mr. Potterton, Stow, Nine Churches, near Daventry, Northamptonshire.

All sown Oct. 28th, 1844, on strong soil, clay subsoil, after vetches, part taken off and limed 20 qrs. per acre.

No.	Name of Wheat.	When Sown.	When it came up.	When Cut.	When Carried.
1	Rattling Jack, Red.	Oct. 28th.	Nov. 16th.	Aug. 30th.	Sept. 11th.
2	White Prize Wheat from Southampton, 1844.	Oct. 28th.	Nov. 20th.	Sept. 11th.	Sept. 17th.
3	Victoria Red Wheat.	Oct. 28th.	Nov. 20th.	Sept. 5th.	Sept. 20th.

QUANTITY AND QUALITY OF PRODUCE.

No.	Name of Wheat.	Quantity Sown.	Produce Good.	Produce Tailing.	Total per Acre.	Weight of Straw.
1	Rattling Jack, Red.	Qrs. bu. gal. 2 1 1	Qrs. bush. 4 1 59 lbs. per bushel.	Bush. 5 50 lbs. per bushel.	Qrs. bush. 4 6	lbs. 3214
2	White Prize Wheat from Southampton, 1844.	Qrs. pks. gal. 2 0 1	Qrs. 3 55 lbs. per bushel.	Qr. bush. 1 3 50 lbs. per bushel.	Qrs. bush. 4 3	lbs. 2771
3	Victoria Red Wheat	Qrs. pks. gal. 2 0 1	Qrs. bush. 4 2 56½ lbs. per bushels.	Bu. pk. 6 1 51 lbs. per bushel.	Qrs. bu. pk. 5 0 1	lbs. 3500

—Journal of the Royal Agricultural Society. SPENCER.

THE BROMSGROVE FARMERS' CLUB.

The following is the substance of the lecture delivered by James Buckman, Esq., F.G.S., at the annual meeting.

In introducing his subject, he observed that the term geology signified not only a description of the earth, but of the changes which it had undergone on its surface. What was agriculture? Simply a knowledge of the best method by which this earth was to be cultivated: and therefore if geology related to its structure, and agriculture to its cultivation, their intimate connection became very obvious. The lecturer next proceeded to explain the rudiments of the science of geology, directing attention first to the different formations of rocks —primary, secondary, and tertiary. The primary rocks were the foundation of the earth, and in them fossils were never found; but in the secondary were discovered innumerable remains of animals, trees, &c., of many kinds. Among the secondary rocks, the Silurian were the most interesting, in consequence of their proximity to coal. This description of rock abounded on Snead's Heath, Lower Lickey, in the immediate neighbourhood of Bromsgrove. Next came the old red sandstone, which also abounded on the Lickey, and was another indication that coal was to be found in the locality; the only question was whether it would be found in sufficient quantity to remunerate for the expense of obtaining it. The lecturer adverted to the coal beds, and the new red sandstone, in succession, and then proceeded to describe the properties of the lias stone for agricultural purposes. He said that, notwithstanding its stiffness, it was in many respects more favourable for good crops than the red sandstone, particularly in hot dry weather, and it was at all times capable of great amelioration; as was also the next kind of rock—oolite, which was likewise the most favourable for crops in dry weather. These two were of the greatest utility in agricultural operations, and if broken up and added to other soils with judgment, were very beneficial; and this showed the necessity of understanding the value and treatment of the different descriptions of rocks; and just in proportion as they acted upon that knowledge would be their success. Upon the oolite rested the red clay, which was not very general, but principally to be found in Sussex; but the most important which they had to deal with in the secondary rocks was the chalk. It was prevalent in Oxfordshire; and the chalk and the soil taken from the Cotswolds were very much alike, and when ground were exceedingly similar. The tertiary rocks, or agriculturally speaking, the London clay, was by Gloucester farmers considered the worst clay of all for cultivation; but on this description of soil both London and Paris were built, and in the vicinity of London were produced the finest and earliest of crops, which fetched the best prices. It might be said that it was owing to the situation being more southerly; he knew it, but that was not all; there was more manure used, and more science brought to bear upon it. Taking a view of the primary and secondary rocks, the lecturer said it would be seen how nature had rendered the operations of agriculture her valuable assistance. The primary rocks had from internal commotion so thrown and displaced the secondary ones as to create the hills and vales, and the consequent flow of rivers and streams. Had the surface of the earth been left a level we should have had in many district nothing but sand like the deserts of Arabia, while the field of mud could not have been rendered arable by the process of draining; it was quite clear therefore that physical changes had been the cause of the earth's fertility, and that fertility would be increased in the same proportion as we observed the manner in which nature had acted. The lecturer then made a few practical remarks upon the application of geological knowledge to the science of agriculture in the treatment of soils. The first description of soil noticed was powdered flint, which, he said, wanted tenacity—it had not within itself sufficient alumina to cause it to adhere to the roots of vegetables, which was necessary for their sustenance. To this kind of soil should be added oolite and chalk, which possessed alkaline properties, and aided in the decomposition of manure, as without decomposition they must all very well know the manure would be useless. This was adduced by the lecturer as one instance among a host of others (which our prescribed limits prevent us from noticing) to show how highly essential a geological knowledge of the soil was to agriculturists. The intermixing of soils was not all that was wanted: that was only a mechanical process, but did not produce the properties necessary for vegetable sustenance. They must inquire if the necessary chemical ingredient be in the soil, and if not, they could not expect to grow upon that soil. Man might be placed in a climate every way congenial to his constitution, but if he had not food he could not exist. Lime and sand were no more food for plants than for man, and hence the great disappointment which many had met with in Worcestershire, because they fancied those materials were to act as a manure. Mr. Buckman then explained, by means of diagrams, the various operations of draining; and said that many persons, from a want of geological knowledge, frequently had drains in an opposite direction to that which would prove of the most essential service. He said the science was also of the greatest utility in the erection of farms upon estates, as a certain method of testing the capabilities of any particular situation for the supply of water, and narrated a circumstance of a farm-house in Gloucestershire which had been erected upon a hill, in the centre of the farm, the well-sinker having informed the proprietor that he doubted not water could be easily obtained. He (Mr. Buckman) happened to be going by, and told the man he could not get water a less than 110 feet from the surface, and it ultimately proved that he was within three inches of the mark; a little geological knowledge in this instance would have saved a vast expense. Another instance of the effects of a want of geological knowledge occurred not far from that town, where a gentleman had given orders to have an estate bought, owing to a tradition that coal was to be found there, and after expending a good round sum of money the opinion of a geologist was asked, when it was found to be a delusion. In purchasing estates or taking farms it was the duty of the purchaser or the renter to see how those farms were situated for lime, sand, &c., and if the farm had oolite and lias upon it, it might be made into a good one. It was on that very principle that Whitfield Farm had proved so successful; it had geological formations of lime and sand, to make good mechanical mixtures; and then it only wanted proper manures and not one-half the working to secure good crops. The lecturer concluded by a few observations calculated to remove the prejudices existing in the minds of some agriculturists against the more scientific treatment of soils, &c., and expressed a hope that what he had endeavoured to explain would have the effect of arousing in them a spirit of inquiry.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

A Weekly Council was held at the Society's House, in Hanover-square, on Wednesday, the 29th of July: present, The Right Hon. Lord Portman, in the Chair; Hon. Robert Henry Clive, M.P.; Sir Robert Price, Bart., M.P.; Sir Offley Wakeman, Bart.; Thos. Raymond Barker, Esq.; John Raymond Barker, Esq.; Colonel Challoner; John Grey, Esq.; W. Fisher Hobbs, Esq.; John Kinder, Esq.; Col. Mac Douall; Philip Pusey, Esq., M.P.; Professor Sewell; W. R. C. Stansfield, Esq., M.P.; J. Baines, Esq.; T. B. Browne, Esq.; W. Pole Carew, Esq., M.P.; A. E. Fuller, Esq., M.P.; Col. Hulse; A. Ogilvie, Esq.; Geo. Parsons, Esq.; Apsley Pellatt, Esq., and T. R. Tweed, Esq.

Chemical Changes in Hay.—Sir John William Lubbock, Bart., favoured the Council with the following communication:—"At present, when so much attention is so usefully directed to Agricultural Chemistry, there is a subject which it seems to me requires elucidation, if only as a matter of interesting speculation. I allude to the change in its chemical constitution, which takes place when hay is stacked. The great heat evolved would seem to indicate some kind of fermentation; and this is further confirmed by the expression usual amongst farmers, that the hay is 'sweetened' by a proper heat. That water is given out in large quantities is often obvious to the eye in the early morning, when the temperature of the circumambient air being low, the vapour is partially condensed, and thus becomes visible. But is water the only product? or does it contain any acid? Are any essential oils evolved? It would also be desirable to explain the effect produced by adding salt when the hay is being stacked. I always, until lately, took for granted that the advantage arising was from the savour of the salt making indifferent hay more palatable to the stock; but the quantity I have seen applied is so very minute, that I can hardly think it would alter the taste perceptibly, and it is possible it may act by promoting or regulating in some way the process of fermentation. I have alluded to the development of acid matter, or evaporation of oily matter, but the capital question to determine is, whether in the fermentation any starch or woody fibre is turned into sugar? This and similar questions are properly speculative, and of scientific interest; but the mode of action of salt or other extraneous substances is important as connected with the quantity which should be used, and is eminently of a practical character."

The Chairman having stated that he had read an interesting Paper on the subject of Hay in the last Part of the Transactions of the Highland Society, the Council ordered their best thanks to be conveyed to Sir John Lubbock for the communication with which he had favoured them, and information given to him at the same time of the article to which Lord Portman had referred.

Miscellaneous Communications:

1. From Mr. Pusey, M.P., Chairman of the Journal Committee, that the Judges of the Potato Essays, for the Duke of Northumberland's Prizes, were still engaged in their examination, and would be enabled to report to the Council on the subject by the end of the Autumn.

2. From Lord Portman; on the good effects he had found to result from mowing down the Potato haulms as soon as the plant came into leaf.

3. From Mr. Pusey, M.P., Chairman of the Journal Committee, informing the Council that the publication of the Journal having been delayed for the purpose of including in its contents the Lecture delivered by Mr. Parkes, at the Newcastle Meeting, the new part would appear on Monday next, and would be found to contain several valuable papers.

4. From Mr. Apsley Pellatt, explaining to the Council the success with which he had carried on experiments for casting pipes of glass for the conducting of water, for forming glass milk-pans of convenient size and shape and at reduced prices, for the use of the dairy; and for constructing glass tiles and arrangements of glass roofs of a durable and economical character, for the admission of light and heat and the exclusion of air or moisture. The specimens and models of these new constructions were exhibited by Mr. Pellatt to the Council, who returned him their best thanks for his kind trouble on the occasion.

5. From Colonel MacDouall; presenting copies of printed papers on artificial manures, on the part of Mr. Fleming, Barochan.

6. From Mr. T. B. Browne; explaining to the Council the character of specimens of the "Cotswold" and Worcestershire White-straw Red Wheat, which he had brought to town for the inspection of the Members; and for which attention the Council returned him their best thanks.

7. From Mr. John Parkinson, of Ley-fields; on the best mode of mixing Linseed-oil with Meal as a substitute for Linseed-cake.

8. From Mr. Reid, of Crediton; on the Potato Disease.

9. From Mr. Stansfield, M.P.; conveying a suggestion on the part of Dr. Hobson, of Leeds, by which, in his opinion, the Society's desire to exclude fat animals from their show of breeding stock would be best effected.

10. From Mr. Wilkinson, of High Buston; Seven communications on important topics of inquiry; on which Mr. Pusey, at the request of the Council, undertook to report at the November Council.

11. From Mr. Voss, of West Bucknowle; on the Cultivation of Stiff Clay Lands.

12. From Mr. Beaumont: on his Plough-Propeller.

13. From Mr. Douglas, of Cockermouth; on Dentition in neat cattle.

Notices of Motion:

The Chairman informed the Council that at their Monthly Meeting in November or December, as it might be found most desirable, it was his intention to bring under the consideration of the Council the question of passing some effectual and stringent measures in reference to the following points:—

1. The instructions to be given in future to the Judges for the purpose of enabling them to decide on the proper condition of animals qualified to compete for the prizes offered by the Society, for improving the breed of Stock.

2. The most effectual mode of preventing, by fine or otherwise, mere nominal entries of Implements or Stock, not followed by actual attendance and exhibition, at the Society's Meetings.

3. A condition in the sales by auction to prevent fictitious biddings, and to render such sales "sales without reserve."

Mr. Kinder, as one of the Stewards of the Yard, undertook to inquire into the case of the entry and sale of a "free martin" (the female of male and female twins) at the Society's Country Meeting.

Mr. Barker having given notice that at the next Monthly Council he should move the usual adjournment and vacation.

The Council adjourned to Wednesday, 5th of August.

A monthly Council was held at the Society's House in Hanover-square, on Wednesday, the 5th of August, present, the Earl of Egmont, President, in the chair, Sir Thomas Dyke Acland, Bart., M.P., Sir Robert Price, Bart., M.P., Thomas Raymond Barker, Esq., Colonel Challoner, F. C. Cherry, Esq., W. Fisher Hobbs, Esq., John Kinder, Esq., William Shaw, Esq., Professor Sewell, J. Villiers Shelley, Esq.

Finances.—Mr. Raymond Barker presented from the Finance Committee the quarterly and monthly returns connected with the accounts of the Society; from which it appeared, that on the last day of the preceding month the invested capital of the Society stood at 7,000*l.* stock, and the current cash balance in the hands of the bankers was 2,573*l.* Colonel Challoner stated that the financial condition of the Society had never assumed a more satisfactory character than it did at the present time, when, in consequence of the great exertions made in reference to every detail connected with the accounts, the arrears were gradually becoming diminished, and steps already in progress to prevent a recurrence of their accumulation. He had also the satisfaction of stating that the country meeting of this year would not entail on the Society the necessity of selling out stock from its funds to meet any unusual excess of expenditure over receipts on the balance-sheet of the Newcastle account.

Newcastle Meeting.—The various complaints of alleged injury, delay, and overcharge, on the lines of the Midland Railway to Newcastle, made to the Council by exhibitors of implements and stock, were referred to the Stewards of the yard, with a request that they would report the result of their examination of these papers to the Council at their monthly meeting in November or December. Mr. Brandreth Gibbs, Director of the yard at the Newcastle meeting, reported the circumstances connected with the two accidents that had occurred on that occasion; and Mr. Shelley, as one of the Stewards of the yard, informed the Council that every means that care and caution could devise in the trial of the implements and that the most stringent maintenance of the rules of the yard would be likely to insure in reference to the conduct of persons in charge of the animals, would be employed to guard against the occurrence of similar accidents in future. Mr. Darling, of Hetton House, called the attention of the Council to the merits possessed, in his opinion, by the drill exhibited at the Newcastle meeting by Mr. Geddes, of Dumfries, and purchased for introduction into South Wales, by Mr. Hodges, of Brecon. Mr. Clayton, of London, and Mr. Comins, of South Molton, addressed communications to the Council on the subject of the respective award of prizes at Newcastle, in the classes of Tile Machines and Subsoil Pulverizers, both of which were referred to the Stewards of the Implement Department for examination, and a report to the Council at their November or December monthly meeting. Mr. Crozer, of Wallsend, called the attention of the Council to the merits which, in his opinion, the Water Apparatus and Tree-lifter—to which he invited inspection at Newcastle—possessed respectively for promoting the vegetation and growth of turnips in dry seasons, and for securing a ball of earth entire in the transplanting and conveyance of large shrubs, evergreens, and trees.

On the motion of Mr. Shelley, seconded by Colonel Challoner, the recommendation of the Judges of Implements at the Newcastle Meeting, that the gold medal of the Society be awarded to Mr. William Crosskill, of the Beverley Iron Works, for his Clod-crusher, "which since the formation of the Society had been constantly exhibited, continuously improved, but never surpassed, and of which the excellence is universally admitted," was unanimously adopted and confirmed.

Northampton Meeting.—Mr. Shelley obtained leave for a postponement of the motion on the appointment of Judges for Implements, of which he had given notice for that day, until the monthly council in November or December, when he intended to move the following resolution: "That in future the recommendation by a member of the Society of any person to act as a Judge at the Country meetings of the Society, should be countersigned by some member of the Council who might be referred to in the selection of the Judges."

Mr. Hillyard gave notice of his intention to move, on Thursday, the 10th of December next—the date for finally deciding on the prizes for the Northampton meeting—the adoption of certain prizes in the classes of Cattle and Sheep, as well as of some effectual means to disqualify for exhibition any animals so fat as to be incapable of performing the functions of breeding stock." Mr. Hillyard also proposed "that at no future shows shall any notice of sale of any cattle or sheep be stuck up till after the Judges shall have made their awards."

German Agriculture.—Sir Thomas Dyke Acland, Bart., M.P., having called the attention of the Council to the circumstance, that the great meeting of German

Agriculturists and Foresters was this year to be held at Gratz, in Styria, under the patronage of the Emperor of Austria and the immediate presidency of the Archduke John, proceeded to detail to the Council the kindred objects of the German Association and the active interest taken by His Imperial Highness in every question and operation connected with practical agriculture and the improvement of the condition of the peasantry, within the range of the Austrian dominions, and concluded by proposing to the Council that the Archduke should be requested to allow his name to be placed on the list of the Honorary Members of the Society, and that a copy of the Society's *Journal* should be presented to His Imperial Highness as the President of the German Association: a motion which was seconded by Colonel Challoner, and carried unanimously. Sir Thomas Acland expressed the gratification it would give him, as requested by the Council, to be the bearer of this resolution, during the present month, to the Archduke, who, he could assure the Council would on his part feel gratified by the compliment paid to him and the Association over which he presided; while on the other hand His Imperial Highness, as the head of the Austrian mountaineers and the friend of every peasant farmer throughout his domains, as the head of the mines of that kingdom, the founder of a museum, and the promoter, at Gratz, of a collection of everything connected with agriculture, would confer an illustrious name on the list of the Honorary Members of the Society, and be the able means of carrying out the objects of the Society in reference to an acquaintance with the agriculture of that part of the continent.

Diseases among Cattle and Sheep.—On the motion of Mr. Fisher Hobbs, seconded by Mr. Shaw, it was resolved, "That diseases among Cattle and Sheep having increased within the last two or three years to an alarming extent in various parts of the kingdom, the Council request the attention of the Veterinary Committee to the subject; and hope they will be enabled to report thereon at the first Council Meeting in November next."

At the suggestion of Mr. Shaw, Professor Sewell expressed his willingness on the part of the Royal Veterinary College, to report to the Council at their next Meeting the number of Lectures delivered on Cattle Pathology, and the number of pupils who attended them. He also took that opportunity of stating the success with which pupils, qualified in the knowledge of diseases both of the Horse and Cattle generally, were now sent forth from the College to every part of the United Kingdom and its dependencies, to America, the West Indies, Australia, and India.

Rabid Animals.—Professor Sewell renewed his application to the members of the Society, that he intended to devote the period of his professional recess during the present autumn to a practical inquiry into the most successful means by which the virus of rabid animals may be counteracted, and the fearful results of hydrophobia obviated. He accordingly requested the co-operation of the members in carrying out this inquiry, and would himself willingly pay every expense connected with the sending up to the Royal Veterinary College, in London, from any part of the country, of such sheep, lambs, or calves, as may unfortunately have been bitten by rabid dogs during the late unusual hot weather, or should become liable to a similar infliction at any future time. He mentioned small ruminating animals only, as being more easily managed when labouring under the worst or most violent symptoms of the disease, than horses, cows, or bullocks, which, under such circumstances, are not only almost unmanageable, but highly dangerous; and when such were intended to be sent to him, he would feel favoured by a previous notice by letter. The animals thus requested might be conveyed in the ordinary railway trucks or cars, or sent by canal boats. By the latter mode Professor Sewell had received a heifer from Worcester a few years ago; sheep and lambs have been sent in covered carts, but the most rapid conveyance is preferable. A sheep or two might be put into crates used for earthenware, and the expense of engaging an entire car be thus obviated, while the animals would be less annoying to the railway agents. Should the disease commence on the journey, the animals should be tied by the legs, and be well littered with straw. Net muzzles might be worn or sent along with the animals, in order to be in readiness. Professor Sewell has, however, never had any fear of rabies being produced by the bite of any animals but those of a carnivorous kind, including swine as such. Of all the numerous cases of canine madness he had seen in horses and other animals, he had not observed a single instance in which they were unable or unwilling to drink water freely. He had always found the disease commence, with a single exception, from the third to the sixth week after the bite had been inflicted. If, therefore, it should not manifest itself in the stock sent to him by that time, he would return the animals to their respective owners free of expense. He trusted that his request might not be considered an irregular one, as he was anxious to effect an immediate communication with the members, and to lose as little time as possible in obtaining objects for his intended research.

Miscellaneous Communications.—The following communications were received with thanks, and referred to the Journal Committee:—

1. From Mr. Hillyard: On dipping Lambs for the purpose of destroying Ticks on them.

2. From Colonel Moody: recommending the son of Mr. Sowerby (the naturalist), of Great Russell-street, as a proper person to be sent out to the Falkland Islands for the purpose of making a collection of genuine Tussac Grass-seed, and acquiring on the spot a knowledge of its cultivation as suggested by Viscount Palmerston, and recommended by Governor Moody.

3. From Mr. Rodwell, of Alderton: A further report on the cultivation of Italian Rye-grass.

4. From Mr. F. Warner, of Cornhill: Specimens of Wheat, with an account of their cultivation.

5. From Mr. Edwards, of Roby Hall: Heads of Barley self-sown, mixed with Italian Rye-grass.

6. From Mr. Churchill, of Cheltenham: Specimens of black Barley, and result of its produce.

7. From Mr. Wratislaw, of Rugby: Specimens of

the Bohemian Turnip, and description of its peculiarities.

8. From Lord Kenyon: On suggestions and advice for practical operations in favour of the poorer classes in case of failure in the Potato crop; on the kind of food to be adopted as a Substitute for Potatoes; and on the success which appeared likely to attend the two prizes of 50*l*. each given by his lordship for the best Dibbled Wheat-field of 5 acres, in the Welsh district, with which Gradington is connected.

9. From Mr. Rowlandson, of Liverpool: part of a cargo of Potatoes brought from Spain, in which extraordinary reproductive powers are displayed.

10. From Mr. Lindsay, of Alford: on the good effects resulting from mowing off the Stems of the Potato plant.

11. From Mr. Lennox Bigger, of Richmond, Dundalk, Ireland: One of the original Potato-scoops for the purpose of removing the Potato eyes for setting, and reserving the remainder of the tuber for food.

12. From Mr. Kerr, of Dunse, Berwickshire: Papers and plans connected with his system of Thorough-drainage.

13. From the Rev. James Robson, of Ponteland Vicarage: Explanatory remarks on the System of keeping Farming Accounts, presented by him on a former occasion to the Council.

14. From Mr. Coxworthy, of Lambeth: A request for a Committee to inquire into the correctness of his views.

15. From Mr. Wickem, of the Isle of Man: Suggesting the publication of illustrative drawings of Prize Implements.

16. From Mr. Hodges, of Down: Report on the composition and agricultural value of Kelp.

17. From Mr. Atkinson, of Harraby: Account of the weather of June, 1846.

18. From Mr. Raymond Barker: Specimens of mummy Wheat, grown by himself, at Hambleden, in Buckinghamshire.

The Council then adjourned over the autumn recess to the 4th of November, granting to the Secretary and to the other officers of the Society the accustomed vacations within that period.

NEW MEMBERS.

Backhouse, Edmund, Darlington, Durham
Bell, Henry, West Sherbourn, Durham
Boultbee, John, Noyadd, Cardiganshire
Bourne, John, Hildenstone Hall, Stone, Staffordshire
Briggs, Rawdon, jun., Birstwith Hall, Harrogate
Bullen, John, Charmouth, Dorsetshire
Bunny, Edward Brice, Speenhill, Newbury, Berks
Carr, George, Greenla Walls, Berwick-upon-Tweed
Chapman, William, Saville-row, Newcastle-on-Tyne
Cooke, Thomas, Newport, Monmouthshire
Collins, John, Southernhay, Exeter, Devon
Dixon, John, Knells, Carlisle
Ellis, William, LL.D., Caistor, Lincolnshire
Foljambe, George Savile, Osberton House, Worksop, Notts
Fox, George Townsend, Durham
Grainger, Richard, Newcastle-upon-Tyne
Grote, Joseph, Grey-street, Newcastle-on-Tyne
Ivens, Thomas, Lutterworth, Leicestershire
Jenner, Arthur Rice, Chiselhurst, Kent
Jutsum, Edward, Romford, Essex
Kay, John Robinson, Bass-lane House, Bury, Lancashire
Knight, Richard, Headley, Liphook, Hants
Lawson, Sir Wm., Bart., Brough Hall, Catterick, Yorkshire
Mathew, Nathaniel, Wern, Tremadoc, Carnarvon
Orford, Earl of, Wolterton Park, Aylsham
Pinchin, David Rice, Box, Bath
Raincock, H. D., Croydon, Surrey
Rippon, George, Waterville, North Shields
Selby, James, Otford Castle, Sevenoaks, Kent
Shanks, William, Bishop-Auckland, Durham
Smithson, Samuel, Heighington, Darlington
Streatford, Richard S., Rocks, Uckfield, Sussex
Lee, Richard, Grove Hall, Ferrybridge, Yorkshire
Thorpe, John, Shenton, Atherstone, Warwickshire
Weatherall, Joseph, Stockton-on-Tees, Durham
Welford, Edward, Hexham, Northumberland
Wilson, Richard Bassell, Cliffe Hall, Darlington
Wilson, Robert, Yarm, Yorkshire
Wood, Richard, 18, Temple-row, Birmingham
Wollaston, Frederick, Sheepy-Magna, Atherstone

HARLESTON FARMERS' CLUB, July 8, 1846.—*Subject:* "The advantages of low fences, and the expense of clipping them." Resolution:—As clipped fences are generally accompanied by what are equally necessary, clean cut borders and ditches, the Club has taken both subjects into consideration, and is of opinion, that the advantages of the practice may be best shown by pointing out some of the evils of high hedges and uncut borders. These are the obstruction of sunshine and air from the headlands and sides of fields, rendering them difficult to cultivate, and the crops on them bad in proportion, notwithstanding that more manure is frequently deposited on them than on any other part of the field by stock seeking shade or shelter; the latter, however, during cold winds, not being equal to that from a good clipped fence. They afford also greater harbour to birds and other animals injurious to the crops, and greatly encourage the growth of weeds. Low and neatly clipped fences, on the contrary, are as useful as they are ornamental, admitting light and air equally to every and that the border and ditch grass may be cut once, and the fences twice, for double that charge! It is recommended that the borders and ditches should be first cleaned, taking care to complete that part of the work before the seeds of the grasses or weeds are ripe; the produce either to be given to store stock in yards, or made into a stack of coarse hay; the fences to be cut immediately after, and again, if thought necessary, at Michaelmas; the clippings to be carried into yards for manure. The second cutting, removing those shoots which would otherwise harden in the winter, renders the first clipping so much easier as not materially to increase the expense.—The Club cannot conclude this resolution part of the field, so necessary to the perfect growth and ripening of corn; whilst early and careful cutting of ditch and border grass prevents the spreading of weeds, keeps the ditches in good order at less expense, and affords better feed after the corn crops are removed. When the Club considers the trifling expense at which these advantages are obtained, it would be surprised that the clipping of fences should be so seldom practised, but for the knowledge that the covenants in almost every lease prevent its adoption. It believes also that there is a prevailing idea amongst many farmers that it is an expensive operation. Those entertaining such an opinion will be surprised to learn, that the Club has satisfactory evidence, that, on an average of farms in this district (noted for its small enclosures), low fences may be cut once a year for the small sum of two-pence per acre! without expressing a hope, that amongst other alterations in the covenants in leases which it has previously recommended, the restrictions on the clipping of fences may be removed.

THE EAST NORFOLK AGRICULTURAL SOCIETY.

LIST OF PREMIUMS, 1846.

Beasts.—For the best short-horn bull, bred by the exhibiter, and calved since the 1st of January, 1844, the society's premium of £8; Lord Hastings. For the second best ditto, £5; Mr. Crisp. For the best short-horn bull of any age, £5; Mr. T. G. Tuck. For the best Hereford bull, bred by the exhibiter, and calved since the 1st of January, 1844, £5; Mr. J. Hudson. For the best true-bred Devon bull, Lord Berners' premium of £5; Mr. J. Hudson. For the best polled bull, £5; Mr. T. Edwards. For the best short-horn cow, in calf or in milk, £5; Lord Hastings. For the second best ditto, £2; Mr. Brady. For the best Hereford cow, in calf or in milk, £5; Mr. J. Hudson. For the best polled cow, in calf or in milk, £5; Mr. Brady. For the second best ditto, £2; Mr. Harvey. For the best short-horn in-calf heifer, bred by the exhibiter, £5; Mr. Brady. For the best polled ditto, £5; Mr. J. Howlett. For the best three weanling short-horn calves, calved since the 1st of January, 1846, and bred by the exhibiter, £3; Mr. T. W. Gilbert. For the best polled ditto, £5; Mr. S. Gooch. For the best short-horn fat steer or heifer, bred and fed by the exhibiter, the Earl of Orford's premium of £5, sweepstakes 10s.; no competition. For the best short-horn fat steer or heifer, £5, sweepstakes 10s.; Mr. T. G. Tuck. For the best polled Norfolk homebred steer or heifer, calved since the 1st of January, 1843, £5, sweepstakes 10s.; Mr. T. G. Tuck. For the best fat steer or heifer of any breed, £5, sweepstakes 10s.; Mr. J. Utting.

Sheep.—For the best shearling Southdown ram, bred by the exhibiter, the society's premium of £5; Mr. J. Overman. For the second best ditto, £2; Mr. T. Crisp. For the best Southdown ram of any age, £5; Mr. H. Overman. For the second best ditto, £2; Mr. J. Overman. For the best pen of three shearling Southdown ewes, bred by the exhibiter, £5; Mr. H. Overman. For the best pen of ten Southdown ewe lambs, bred by the exhibiter, £5; Mr. R. H. Gurney. For the second best ditto, £2; Mr. G. B. George. For the best pen of three shearling Down wethers, £5, sweepstakes 5s.; Mr. H. Overman. For the second best ditto, £2, sweepstakes 5s.; Mr. H. Overman. For the best shearling Leicester or long-woolled ram, bred by the exhibiter, £5; Mr. R. B. Harvey. For the second best ditto, £2; Mr. R. B. Harvey. For the best Leicester or long-woolled ram of any age, £5; Mr. R. B. Harvey. For the second best ditto, £2; Mr. R. B. Harvey. For the best pen of three shearling Leicester ewes, bred by the exhibiter, £5; Mr. R. B. Harvey. For the second best ditto, £2; Mr. R. B. Harvey. For the best pen of ten wether lambs of any breed, bred and fed by the exhibiter, £5; Mr. R. Waites. For the second best ditto, £2; Mr. R. H. Gurney. For the best pen of three shearling wethers of any breed, £5, sweepstakes 5s.; Mr. G. Eaton. For the second best ditto, £2, sweepstakes 5s.; Mr. J. Utting. For the best pen of ten half-bred Down and Leicester lambs, bred and fed by the exhibiter, J. S. Muskett, Esq., premium of £5; Mr. J. Utting. For the best pen of ten shearling Southdown ewes, Sir John P. Boileau's premium of £5; G. B. George.

Horses.—For the best cart stallion, having travelled exclusively in East Norfolk during the last season, £10; Mr. R. Hunt. For the best cart mare and foal, £5; Mr. G. Eaton. For the second best ditto, £2; Mr. T. Edwards. For the best cart mare, £5; Rev. J. H. Steward. For the second best ditto, £2; Mr. W. P. Salter. For the best cart gelding, bred by the exhibiter, £5; Mr. J. Lane. For the best two years old cart filly, £4; Mr. W. P. Salter. For the second best ditto, £2; Rev. J. H. Steward. For the best two years old gelding cart colt, bred by the exhibiter, £3; Mr. R. Gillett. For the best stallion for saddle or harness, having travelled in Norfolk during the last season, £5, sweepstakes 20s.—No merit.

Swine.—For the best boar, £3; Mr. Redgrave. For the second best ditto, £2; Mr. R. B. Harvey. For the best breeding sow, £3; Mr. R. B. Harvey. For the second best ditto, £2; Mr. R. B. Harvey. For the best pen of eight store pigs, not exceeding six months old, being of one litter, and bred by the exhibiter, £3; Mr. Redgrave. For the best fat hog, bred by the exhibiter, £2; Mr. R. Gillett.

Implements.—To the exhibiter of the best newly-invented implement for the purpose of agriculture, the utility and price whereof shall be approved by the judges, £5; Mr. R. Garrett, for his patent Kent drill. To the exhibitor of the second best ditto, £4; Mr. Holmes, for a drain-pipe and tile. To the exhibitor of the best cart for agricultural purposes, £1 10s.—No entry.

THE POTATO DISEASE.

Sir,—As the potato disease is reported to prevail, I offer my opinion as to the best mode of reducing the loss of the crop.

The instant the leaves are affected the tubers are checked in their growth, and as soon as the stems are infected cease to increase in size, thus it appears that the tops should be cut off before the diseased sap descends to the roots.

As the tubers do not increase in size after the stems are affected, all the loss occasioned by the decay of the roots arises from the tops not being cut and cleared off the land before the tubers are infected; at least I have reason to believe such is the fact.

It is generally believed that the disease appears first on the leaves, then on or in the stalks, and then the decay of the sets occurs and innoculates the tubers. The first produced near the seed were first affected, those produced on the long runners chiefly escaped; this accounts for the average reported loss being two-thirds of the crop, viz., one-half of the tubers in number were destroyed, and these were first produced, and of double the size of the tubers that were not affected.

We may hope and expect that this pest will decrease, and altogether cease. The cause of the disease is not known, and if known no means exist to prevent it; the only benefit which can arise from being aware of the cause would be to judge of the probability of its continuing or ceasing to exist, and thus be enabled to judge whether it is prudent to continue growing potatoes.

As the disease has prevailed in many countries, it is evident it is not caused by climate. It was not caused by excess of moisture last year as asserted, because we have had wetter summers without any appearance of the disease; nor was it the absence of sun, as we have had similar seasons; nor was it caused by age, as new sorts raised from seed did not escape. Thus, it appears probable that the disease was and is caused by some unwholesome vapour produced by a volcanic eruption.

A smothering, stinking, palpable fog was reported to have been noticed in Holland last year previous to the potatoes being affected, and a similar fog prevailed here at sunrise several times during last summer, and the same kind of mildewing or unhealthy vapour has occurred lately.

If the potatoes attacked by the disease are of the early species, if dug and exposed to the air a few days, such roots as are not marketable may be planted to raise a crop for winter and spring use. This, however, is only adapted to garden culture, as small sets planted late in summer require to be watered to insure a fair crop.

It is the general opinion that the disease first attacks the leaves of the potatoes, but some doubt whether this is the case, and presume that the set is first affected, or if not that the disease is conveyed from the stalks (shaws) to the seed (sets), and that the decay of the sets causes the decay of the tubers which they touch, and thus such tubers as are produced from long runners escape infection.

If it is "an incipient disease," or if the decay of the sets cause the decay of the tubers, the sets should be taken from the plants as soon as disease is apparent.

If land is in a rough state, or the season dry, the young plants are nourished by the pulp of the sets; thus it is prudent to plant fair-sized sets: but when the plants are a few inches high the sets may be taken away without injury, if the land is in a pulverized state and not a severe drought, or can be watered.

As Mr. J. W. Rogers truly states, the growth of potatoes is of national importance, and to the working classes the reducing the cultivation would be a great loss. No other crop can be so suitable or valuable to a labouring man who has a garden or allotment. Potatoes can be grown continually on the same land and produce double the quantity of food compared to grain, remain safe from injury from birds or insects till it is convenient to use them or take them up to store.

There may be as much nutriment in carrots, parsnips, beet, &c., as there is in potatoes, but these roots are not relished except as sauce to meat, and the whole of the brassica tribe is useless as food to a labouring man, nor does there appear to be any substitute to be found for potatoes; the Jerusalem artichoke probably is the next in value.

I believe that earthing up potatoes to within a few inches of the tops of the stems will prevent the tubers from being affected by the disease. The reason why I think so, and that the disease first attacked the leaves, is from having earthed up one root of potatoes last year, as the tops grew to within a few inches, to ascertain whether more tubers would be produced. The leaves and stems were diseased, and rotted off level with the ground before I took up the tubers in October, but the tubers were perfectly sound and upwards of 40 in number, but had evidently been stopped in their growth as soon as the tops were diseased. I conclude it was being earthed up 18 or 20 inches that prevented the tubers from being affected, because the tubers at another root growing within a yard and not earthed up were nearly all rotten. I planted these potatoes in my experimental bed for two reasons. They were of different sorts, and I wished to ascertain which was the most prolific. The plant I earthed up was of a species which require earthing up, producing tubers near the surface of the ground; the one not earthed up produces tubers in a cluster round the set; thus a question arises as to whether the tubers of the plant earthed up being produced further from the set than the tubers of the plant not earthed up was the reason they escaped infection, or was it from being earthed up. I am, sir, your obedient servant,

Witnesham, August 3. Chas. Poppy.

REMARKS ON THE AGRICULTURE OF ABERDEENSHIRE.

BY THOMAS SULLIVAN.

No. IV.

IMPLEMENTS.

It appears that when Dr. Keith drew up his agricultural survey of Aberdeenshire, the implements of husbandry were, with few exceptions, of the rudest description, and but very ill-adapted to the purposes they were intended to serve. Since that period (1810), however, much attention has been devoted to this department both by agriculturists and mechanists; the result of which has been that numerous and important improvements have been effected in the construction of all the instruments employed in this county. Several new implements and machines have also been invented or introduced within the last few years; so that it may now be averred, that though there are doubtless some counties much better, there are many worse provided than Aberdeenshire with effective agricultural instruments. All intelligent cultivators being fully sensible that costly and imperfect work necessarily results from the employment of defective implements, no reasonable expense is spared by them in procuring the best that can be obtained. Several useful instruments have recently been introduced from England and the south of Scotland; and the ingenuity of the native mechanics has also been successfully exercised in effecting some decided improvements on the various agricultural implements employed in the county.

In order in some degree to methodise my observations, it may be as well to class the implements and machines in general use under the following heads, viz.—1, Tillage implements; 2, Sowing machines; 3, Barn machines; and 4, Wheel-carriages, or carts. In a brief sketch—as this must necessarily be—it is obviously impossible to present anything approaching a minute description of the various instruments included under the foregoing general heads; my remarks shall therefore be confined to those most commonly employed, and to the principal improvements which have recently been effected in their construction.

I. Tillage Implements.—This class includes the implements employed in turning up, pulverizing, and preparing the soil for the production of crops; also those used in the after-culture of potatoes, turnips, beans, &c., and comprehends the plough, the harrow, the roller, the grubber or cultivator, and the various kinds of horse-hoes.

Ploughs.—No other agricultural implement has undergone greater improvement within the last few years than the plough; and it is but candid to state that that employed throughout Aberdeenshire until a comparatively recent period stood greatly in need of various alterations to fit it for the execution of efficient work. With the swing-plough of the present day, a pair of stout horses can plough deeper, and turn over more ground in the same space of time, than could have been done by a team of eight or ten oxen with the cumbrous wooden implement which was almost exclusively employed here some forty years ago.* The improved iron swing-plough is now pretty generally adopted in this county, and bids fair at no distant period to supersede the wooden kind altogether. The latter is still, however, by far the most common; and its employment is rendered in some degree necessary by the existing condition of much of the arable land. Although it is regarded as a matter of indifference, so far as the working principle of the plough is concerned, whether the frame-work be constructed of wood or of iron, provided the several parts are of sufficient strength to withstand the strains to which they are likely to be subjected, yet the iron instrument is now preferred in improved districts, and has become general wherever agriculture is in an advanced state, as being decidedly superior to the other in point of durability, and in admitting of a neater and more convenient form. When properly constructed, it also works cleaner, and is more manageable in the hands of the ploughman.

The wooden plough is, however, considered to be better adapted than the iron one to the tillage of land in which large stones have to be encountered; and, as was observed in a previous article, detached boulders, some of which are of immense size, exist in many parts of this county. Being found immediately beneath, or protruding through the surface, they constitute a formidable obstacle to the action of the tillage implements. The iron plough is more liable than the wooden one to be deranged or broken by violent shocks, and it is also somewhat more difficult to manage in stony land. Hence the preference generally given to the latter for breaking up waste or heath-ground, which, in Aberdeenshire, abounds with boulders. The larger class of farms are, in many instances, provided with both wooden and iron ploughs, to suit the different kinds of soil, the former being employed on the "outfield" land, the latter on the "infield." The Aberdeenshire wooden plough has the beam and handles of wood, the mould-board and side-plates of cast-iron, and the sole, head, coulter, and share, of wrought iron. The usual price of a wooden plough is 3*l.*; that of an iron plough, 4*l.* 10*s.* Though the former is thus the cheaper at first, it eventually becomes the more costly of the two. The average duration of a wooden plough is six years; consequently, three sets of them will be required during the currency of a nineteen years' lease: whereas, an iron plough, if taken proper care of, will be but little the worse at the expiration of that period. Indeed, the writer has lately been informed of one which has been in almost constant operation during the last thirty-seven years; and all the repairs it has needed, exclusive of new metal and shares, has not cost above 10*s.* The comparatively low price of the wooden instrument is, however, a great inducement to the small farmer, whose capital is, in general, very limited.

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* See Keith's Survey, p. 163.

* Prior to the beginning of the present century, the plough used in this county was of a very clumsy and imperfect construction; and was drawn by six or ten horses, and sometimes even so many as twelve oxen.

Both the wooden and the iron plough are now most frequently drawn by two horses or oxen, yoked abreast; but three, and even four horses are occasionally attached when ploughing beyond the ordinary depth, as is sometimes done when giving the first or winter furrow to stubble-land intended to be in green crop the ensuing season. In breaking up waste ground from a state of nature, a wooden plough of larger dimensions than the common kind is employed, which is generally drawn by six oxen, these animals being found more suitable than horses for ploughing coarse land containing stones, as they pull more slowly, steadily, and equably.

The iron ploughs now employed in Aberdeenshire are in general of the best construction. The utmost attention has of late years been directed to the improvement of this useful instrument; and the ingenuity of our mechanics has been not unsuccessfully exercised in determining the form best calculated to effect the purposes it is intended to serve. Of course those manufactured by different plough-makers differ from each other to a greater or less extent; but the majority of them bear some resemblance to the Currie or Mid-Lothian plough (described in the "Farmer's Magazine" for April, 1845), more particularly in the form and connection of the working parts. One of the leading characteristics of that instrument is that the *mould-board* is prolonged forward, so as to cover the neck of the *share*, and presents a medium degree of concavity. The share is chisel-pointed, and varies in breadth according to the texture of the land to be ploughed. A long, narrow share is used in ploughing ground that contains a great number of small stones. The majority of the Aberdeenshire ploughs are furnished with what is commonly designated a "chain-bar," which is merely an iron rod extending from the *bridle* to near where the *coulter* is inserted in the *beam*, and is added chiefly with the view of strengthening the latter part of the implement.

Several important improvements have, during the last few years, been effected by different mechanics in the construction of the plough; but in a brief sketch like the present, it is quite impossible to advert minutely to these. The great objects kept in view by the improvers of the implement have been to render it more capable of effecting in a satisfactory manner the various purposes for which it is intended, more easily drawn by the animals, and more manageable in the hands of the ploughman. In order to the attainment of the first of these desirable objects, the relative positions of the cutting parts, viz. the coulter and share, and the form of the mould-board, have undergone considerable alteration, with a view to cut the furrow-slice in the most proper shape, and to lay it over in the most eligible position. For the purpose of lessening the draught, the length of the beam has been much diminished; which allows the moving power, *i. e.* the animals of draught, to be placed nearer the resistance to be overcome: and the breast has been made narrower and more taper, so as to approach as near as possible to the form of a wedge; the advantage of which, in rendering the plough more easily drawn, is too apparent to require any explanation in this place. In order to render the instrument more easily held, or rather, directed, the length of the *stilts* has been increased by several inches; and, as these constitute the ploughman's lever, it is obvious that his power over the motion of the implement has been thereby considerably augmented. The *sole* and side plates have also been lengthened a few inches, which evidently serves to render the plough more steady in its progress through the soil.

A few plough-makers in this county have recently constructed what is designated a *friction-wheel plough*, in which a small wheel, affixed between the mould-board and the left stilt, is substituted for the sole, with the view of diminishing the power required to draw the implement. It is, perhaps, scarcely necessary to observe that a considerable proportion of the draught of the plough is occasioned by the friction of the soil upon the sole-plate and share, arising chiefly from the weight of the instrument; and it is equally obvious that much of this friction is obviated by substituting for the sole a small wheel on which the body of the plough rests. But, notwithstanding the advantage in this respect which a properly constructed friction-wheel plough may be expected to possess, it has hitherto been but little employed in any part of the United Kingdom, although invented, it appears, so far back as the year 1825, by that ingenious mechanic, Mr. Wilkie, of Uddingstone, near Glasgow; nor is it likely to be at all generally approved of in Aberdeenshire. The great objection to its employment arises from its unsteady motion in the ground, in consequence of the absence of the sole, which of course renders it difficult for the ploughman to execute proper work. Besides, it is obviously inadmissible in the ploughing of stony land, which is very common in this county. The wheel, also, is more costly than the sole.

A simple but beneficial improvement on the common plough was effected a few years ago by Mr. Rae, of Ardmiddle, in the parish of Turriff, which has been thus described by himself:—"It occurred to me that an improvement might be made on our common plough for the purpose of stirring up the bottom of the furrow, where, in many soils, there was a considerable depth of good mould, that had lain for ages unproductive: and from the action of the sole of the plough, when ploughed in a damp state, it is skimmed over, and thus rendered more impervious to air and moisture. With a view to get a sort of second coulter attached behind the heel of the plough, by straightening the beam a little, so as to admit of a similar bore to that in which the foremost coulter is fixed, and by a knee upon it, it is made to work in the middle of the bottom of the furrow to the depth of from four to six inches, as may be necessary. Latterly I have improved on it, by having what may be called a shoe or feather of steel attached to the end of it, about two inches wide at the back, tapered to a point, which now stirs up the whole breadth of the furrow. When inserted to the depth of five inches, to make her work steady, a wheel is attached, which being removeable at pleasure, as well as the additional coulters, she then becomes a common plough again."*

Different kinds of the subsoil-plough, and also of the trench-plough, are employed and manufactured in this county; but it is deemed unnecessary to occupy space with any description of these, as they present, so far as the writer is aware, no peculiarity of construction worthy of being noticed in this place.

The swing-trees, or swingle-trees (as they are indiscriminately termed), for yoking two horses or oxen to the plough, being of the usual form, and most generally composed of wood, need no description. It has been remarked, in a preceding page, that three horses are frequently yoked abreast in ploughing stubble ground intended for green crop; and, with the view of equalizing the draught as much as possible, a very ingenious though simple apparatus is employed by some farmers, which, from its utility and adaptation to the object in view, merits a brief notice in this place. It consists of a combination of compensating levers united to an apparatus of swing-trees. The main swing-tree is usually five feet in length, and of sufficient strength to withstand the force of three stout horses; and the animals are attached in the ordinary manner, by draught-chains, to three wooden trees of the common size. The compensating apparatus, consisting of three iron levers very ingeniously connected, is placed between the main swing-tree and the smaller ones, and is most generally composed of cast-iron. Three horses yoked abreast by means of this apparatus are, it is considered, equally effective as four attached two and two in the usual manner.

Harrows.—The harrow now generally employed in this county is of the improved rhomboidal form, the old rectangular kind being almost entirely abandoned. That formed of wood is by far the most common; but the iron harrow has recently been introduced, and there is every reason to expect that it will become quite general at no distant period. It is much approved of by some farmers, though the price is considerably above that of the wooden harrow. This, however, is counterbalanced by the much greater durability of the iron implement as compared with the wooden one. Another advantage which the former possesses over the latter is, that it is less liable to become clogged with earth and weeds when the ground is damp. The iron harrow is also found to be the more effective in reducing a cloddy surface, and is therefore preferred by many farmers for pulverizing clay soils. Its length is usually four feet, and its breadth three feet five inches. The price is generally 3*l.* 15*s.*; while that of the wooden kind is only 16*s.* to 18*s.* Besides the common seed-harrow to which we have been adverting, each of the large and medium-sized farms is provided with a pair of light wooden harrows, furnished with short teeth, for the purpose of covering in the seeds of herbaceous plants.

Rollers.—Until within a comparatively recent pe-

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* New Statistical Account, page 998.

riod, the roller almost exclusively employed in this county consisted of a cylindrical piece of granite, attached to a simple frame-work of wood. The usual length is six feet, and the diameter one foot. In conjunction with the harrow, the stone roller is found to be very effective in pulverizing the soil for turnips and other green crops.* Rollers constructed wholly of wood are now, however, very generally employed throughout Aberdeenshire. They are generally six feet in length, two and a half feet in diameter, and divided into two segments, which revolve independently of each other; but the wooden roller, like the stone one, sometimes consists of only one piece; though, as it is almost needless to observe, the bisected cylinder is turned at the headlands with greater ease to the horse, and with less injury to the plants in rolling corn fields in spring or early summer. The soil of this county being in general light, and easily pulverized, cast-iron rollers are but little needed or employed, except in some parts of Buchan and a few other places abounding in heavy clay, where this kind of roller has latterly been resorted to with much advantage. Even Crosskill's far-famed clod-crusher has found its way into Aberdeenshire; and seems well adapted not only for finely pulverizing stiff, tenacious soils, but also for imparting consistency to the old "infield" land, which by long-continued cultivation has been rendered very loose and incoherent, and is therefore liable to be affected to an injurious extent both by the frost of winter and the heat of summer.

Grubbers.—The same circumstance that renders the use of the cast-iron or other heavy roller unnecessary for effecting the pulverization of the soil of the greater part of this county, sufficiency accounts for the grubber not being much resorted to in the preparatory tillage for green crops. The proportion of clay to be met with in Aberdeenshire being comparatively small, the farmers in general experience much less difficulty in adequately pulverizing the soil than those of other quarters in which the land is of a more adhesive character. Some greatly improved forms of Finlayson's harrow are, however, employed in many parts of the county, and the number of this class of implements is rapidly increasing. Kirkwood's grubber, which was introduced some years ago from East Lothian, is also used to some extent in the division of Buchan, where the soil consists chiefly of clay. The grubber is resorted to, on the majority of farms, more for the purpose of dragging up couch-grass (*Triticum repens*) and other root-weeds to the surface, than of producing a fine tilth; though by an efficient implement of this kind both these desirable objects are simultaneously accomplished. There is, therefore, hardly any description of land, in the preparation of which for green crop the grubber may not be beneficially employed as an auxiliary to the other tillage instruments. If unnecessary for pulverizing, it will, in all probability, be useful for cleansing the soil.

There is another kind of grubber very much used in this county, particularly on the smaller class of farms, and which differs considerably from both Finlayson's and Kirkwood's. This consists of a triangular-shaped frame-work of wood, mounted on low wheels, in which frame-work are inserted a number of coulters, adapted, like Finlayson's, both for pulverizing the soil and for dragging root-weeds to the surface. It is drawn by two horses, and loosens the ground to the depth of from eight to twelve inches.

An implement called a *break*, or *drag-harrow*, is also very commonly employed in this county for loosening, pulverizing, and cleansing the ground while undergoing the preparatory tillage for green crops; and, in the opinion of some farmers, it effects these purposes as efficiently as the grubber. It is similar in form to the common seed-harrow, but much heavier, and of larger dimensions, being intended to reduce cloddy surfaces, on which the latter would have little or no effect. It is formed of wood, and is drawn by two or three horses, according to its weight. The longitudinal bars are formed of the best larch, the crossbars of good ash. In the two-horse break or drag, the longer bars, technically designated "bulls," are commonly 6 feet 6 inches in length, and 4 inches in width by 5 inches in depth. The cross-bars are 3½ inches in width by 1½ inches in depth; and the whole breadth of the instrument is 5 feet 6 inches. There are four longer bars at the distance of 1 foot 4½ inches from each other, and each bar contains five iron teeth, 9 inches in length, beneath the wood. In the drag-harrow for three horses, there are five longer bars, or "bulls," as they are termed, in each of which is inserted five iron teeth, 10 inches in length. The whole length is 8 feet 4 inches, and the breadth 7 feet. The efficiency of this heavy kind of harrow as a pulverizer arises in a great degree from the action of the frame on the surface of the ground. The price varies from 1*l.* 5*s.* to 1*l.* 12*s.*, according to the dimensions.

Horse-hoes.—The implements of this class are such as are employed in the after-culture of potatoes, turnips, and other drilled crops, the object being to cleanse and pulverize the soil in the intervals between the rows during the growth of the plants. The horse-hoes and scufflers generally used in this county differ so little from those of the same class employed in most other localities, that any detailed description of them would be quite superfluous. The instrument most generally employed for tilling the intervals of potatoes and turnips, which are the principal drilled crops cultivated in Aberdeenshire, consists of a framework of wood, in which are inserted shares and coulters of iron: the beam and handles are also formed of wood. Many of the instruments of this class are now, however, formed wholly of iron, the extremity of the beam being sometimes supported by a low wheel, and the frame so constructed as to admit of expansion and contraction at pleasure, in order to suit drills of different widths. The place of a beam is not uncommonly supplied by a draught-chain, to which the animal is attached, the instrument being thus better fitted for separating weeds from the soil. In the frame are inserted five coulters, or cutters, so arranged as always to move in different tracts. The price is commonly 1*l.* 12*s.*

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* Price of stone roller, complete—from 1*l.* 10*s.* to 2*l.*

II. Sowing Machines.—This class includes machines for depositing the seeds of turnips, pulse, and occasionally corn, in rows; also a machine for sowing corn and the seeds of herbaceous plants broadcast. These are now so generally employed, and so well known to all engaged in agricultural pursuits, as to render any description unnecessary, more particularly as none of them have originated in Aberdeenshire, those used in the county having been imported chiefly from Leith; and no improvement worthy of notice has recently been effected. The turnip-sowing machines are of the most approved construction, and differ but little from those in use in all well-cultivated districts. Different forms of this useful instrument are now employed, each of which, however, is drawn by one horse, and sows two drills together.

A machine for depositing guano, bone-dust, or other pulverulent manure, simultaneously with the seed, has recently been introduced; but it has been employed only by the larger class of farmers. Most of the small holders and crofters use a turnip-barrow, which is pushed forward by a man, and sows only one row at a time.

The broadcast sowing-machine is now employed to a considerable extent in the sowing of grain and grass-seeds, and bids fair soon to become generally used throughout the county. Its utility consists in the regularity with which it distributes the seeds, in obviating the difficulty and loss necessarily attendant on hand-sowing during high winds, and in effecting a considerable saving of seed. The seeds of clover and other herbaceous plants are very rarely sown by the hand, except on the smaller sized farms, this machine being peculiarly adapted for distributing small, light seeds with the greatest regularity. Formerly it was mounted on only two wheels, from one of which motion was communicated to the distributing apparatus in the interior of the seed-box: it is now generally supported by three wheels, the additional one placed in front, being of much advantage to the animal, particularly in going down a declivity. The corn drill-machine is but very partially employed in Aberdeenshire, the broadcast mode of sowing being practised almost exclusively. But from the results of the trials which have been instituted by Mr. Hay, of Sheathen, near Tarves, and a few others, it appears that the row mode of culture might be adopted with much propriety and advantage on the soft, incoherent "infield" lands of this county, more particularly if infested with weeds, as the intervals between the rows admit of tilling and cleansing the ground by the hand or Dutch hoe during the growth of the crop.

III. Barn Machines.—Under this general head are classed the various machines employed for the purpose of separating the grain of corn from the straw, and subsequently from the chaff or husk, or the different thrashing and winnowing machines. It is proper we should begin with the

Thrashing-Machine.—It appears that the thrashing-machine was first employed in this county about the year 1790, but that, like all great improvements connected with agriculture, a considerable period elapsed before it began to be generally used, or its usefulness to be appreciated. At present, however, all, except the very small farmers, have thrashing-machines suited to the extent of their respective possessions, the flail being employed almost exclusively by the crofters or cottagers. As the thrashing-machine is very justly regarded as the most useful agricultural implement that has ever been invented, it is hoped the following observations will not be altogether devoid of interest.* About sixty years ago, several attempts were made in this county to construct a machine for the purpose of thrashing corn, but all proved more or less abortive. In 1790, however, a machine was erected at the farm of Knockleith, from a model of one some time previously invented, or at least greatly improved, by Andrew Meikle, of Knowhead, near Prestonkirk, East Lothian, by which the operation was accomplished in a manner much more satisfactory than on any former occasion. Though clumsy in form and workmanship, it appears that its construction exhibited the leading mechanical principles of the most approved machines of the present day. It consisted of two feeding rollers and a cylinder or drum, with scutchers or beaters (as they are indiscriminately termed) affixed longitudinally on the circumference of the drum, and the requisite gearing for communicating motion to the whole. In this state it remained for several years, until the *shaker*—a very useful and essential appendage—was added, by means of which the labour of separating the grain from the straw was very considerably diminished. The last-mentioned part has undergone various alterations since its first addition to the thrashing-machine. Originally it consisted of merely four vanes or leaves, with a number of short wooden pegs inserted at their extremities. Some were of a square or rectangular form; others were five-sided; but no other kind proved nearly so effective as the cylindrical shaker now generally employed. In many places two shakers are appended to the machine.

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* The reporter is indebted to an ingenious millwright of this county for many interesting particulars relating to the thrashing-machine and its appendages.

Some important improvements were effected in the construction of the thrashing machine shortly after its introduction into Aberdeenshire, by the Messrs. Skene, who, it appears, possessed a very large amount of mechanical knowledge. They originated what are commonly designated the low-drawn mills, now so much approved of throughout the country. The first of this kind which they erected was made in 1809; and though merely a two-horse power, it thrashed, as I am informed, at the rate of six quarters three bushels of corn per hour. In illustration of the comparative perfection arrived at in the construction of the thrashing machine shortly after its introduction, I may mention that in 1799, a machine, propelled by water-power, was erected in the parish of Kintore, in this county, for 31*l.*, including the dam and water-course, which thrashed at the expeditious rate of fourteen quarters per hour. This is stated on the best authority—the aged owner of the machine in question. It is proper to add that it was reckoned a three-horse power. The feeding rollers were 3 feet in length; the drum was 3 feet in diameter, and made eight revolutions for one of the water-wheel, which was 8 feet 8 inches in diameter, and the floats 8 inches in width by 1 foot 4 inches in length. It was what is technically designated an *undershot* wheel.*

Few of the thrashing-machines now erected at double the cost and of double the power of the one just referred to will thrash so much as fourteen quarters of oats per hour. In fact, the quantity ordinarily thrashed by a two-horse power machine does not exceed three quarters per hour. A machine requiring a motive force of three horses commonly thrashes from five to eight quarters; and a four-horse power is expected to thrash, on an average, about ten quarters per hour; but it may frequently accomplish twelve, and even fourteen quarters. It may not be amiss to insert in this place the dimensions of the principal parts of a thrashing-machine of the latter power, which was recently erected for a gentleman in this county, and is allowed to be of the most approved construction. The impelling-agent is water; the diameter of the wheel is 11 feet; and the buckets are 3 feet 4 inches in width. The feeding rollers are 3½ feet in length; the diameter of the drum is 3 feet 2 inches; and that of the shaker is 5½ feet. A winnowing apparatus, driven by Barker's centrifugal wheel, is attached to the thrashing-machine. Being furnished with two "hoppers," it can be employed in dressing grain either simultaneously with the thrashing or when the machine is not in operation. The cost of erecting the whole machinery was 58*l.* The average rate of thrashing is twelve quarters per hour; and the quantity of water necessary to accomplish this work varies from 1600 to 2000 cubic feet for every quarter, according to the quality of the corn and the length of the straw.

The thrashing-machines employed in this county vary very much in size and power,* in consequence of the great diversity that exists in the size of farms. A four-horse-power machine is commonly used on farms ranging from 150 to 300 acres, a three-horse-power on those varying from 80 to 150 acres, and a two-horse-power on the smaller class of farms from 25 to 80 acres. A machine requiring only the power of one horse to propel it is sometimes resorted to on small possessions of about 20 acres. The grain-crop on holdings under the last-mentioned size is most generally thrashed by the flail; and the cottagers perform this operation in the winter mornings by the light of the lamp, or during inclement weather, when out-of-door labour is suspended. It is supposed that the thrashing-machines at present employed in Aberdeenshire are impelled by an aggregate force of at least 8000 horses: but, owing to the great extent of the county, this is a point which it is very difficult correctly to ascertain.

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* There are three sorts of water-wheels, commonly known as the *overshot*, the *undershot*, and the *breast* wheel. The first derives its name from the water coming in contact with and passing over the upper part of the wheel; the second, from the water, after impinging on the floats, flowing underneath; and the third, from the water striking at a point in the circumference of the wheel intermediate between the former.

* A simple rule for ascertaining the power of a water-impelled thrashing-machine is to cube the radius of the wheel, multiply the square-root of this by the area of the transverse section of the water where it impinges on the wheel, and divide the product by 6½: the quotient is the horse-power to which the wheel is equivalent.

The motive powers employed in this county for the purpose of impelling thrashing-machines are water and horses. The former, as being not only the most economical, but likewise the most effective agent, is, of course, invariably preferred and used wherever an adequate supply of it can conveniently be procured; and as the many hills and dales with which the surface of the county is diversified give rise to numerous rivulets, water-impelled machines are very general throughout Aberdeenshire. The superiority of this power over horses (irrespective of its greater economy) consists in imparting a more uniform motion to the machinery, and in enabling the farmer to thrash and prepare his corn for market or other purposes in all states of the weather, when a sufficiency of water is available. Horse and water power are occasionally employed in conjunction, which, in some situations, is found a very useful arrangement. During the droughty months of summer, the former is put in requisition either by itself or as an auxiliary to the latter, though at other seasons the supply of water may be quite adequate to impel the whole machinery. In order to convey some idea of the comparative advantages of the three modes of propulsion referred to, viz.—by horse-power, water-power, and both conjointly, a great number of farms of different sizes have been selected; and the actual power of the thrashing-machine employed on each having been ascertained, it has been found that on those farms on which animals alone constitute the motive force, one-horse power is required for every twenty-four acres on an average; but that where water alone is employed, one horse-power is found to be sufficient for thirty-three acres; while on those on which both agents are used in conjunction when necessary, the same power is quite adequate for every thirty-four acres of arable land.

The steam-engine has recently been resorted to by a few farmers in this county, for impelling the thrashing-machine; but, for several reasons, this all-powerful agent is by no means likely to be either much or very profitably applied to farm purposes in Aberdeenshire. In the first place, it is more expensive than either horse or water power. As no coal is found in the county, the cost of fuel would amount to a considerable sum per annum in the internal parts, not to mention the original cost of an engine and its appurtenances. And in the second place, this being more a grazing than a corn-growing district, the quantity of grain annually grown on individual farms of even the largest extent would hardly warrant the erection of a steam-driven thrashing-machine. This agent, being vastly superior to horse-power, is generally preferred and employed in localities (such as the Lothians and Berwickshire) abounding with extensive farms, where coal is abundant and cheap, and where a very large quantity of grain has annually to be thrashed and prepared for market; but in Aberdeenshire neither of these conditions can be said to exist. The steam-engine is, of course, both inaccessible to and unnecessary for small farmers; and to use it with economy, even on large possessions, it is requisite to continue the operation of thrashing throughout a whole day at a time; which in general is neither convenient nor necessary in this part of the country. There are at present, I understand, no more than five thrashing-machines in Aberdeenshire impelled by steam.

The expense of thrashing and dressing grain per quarter varies according to the nature of the motive force employed, the power of the machine, the quality of the crop, and other obvious circumstances. Water, where it can be procured in sufficient quantity for the purpose, constitutes by far the most convenient and economical impelling agent. A most important advantage attending the employment of water-driven machines is, that by them the greater proportion of the crop may be, and in Aberdeenshire generally is, thrashed and dressed in the winter mornings, before the labours of the field could be commenced. The common practice is this:—A part of the barn having been previously filled with sheaf-corn from the stack, the thrashing is prosecuted for an hour or more every morning, beginning about five o'clock, and leaving off at break of day; the servants then breakfast, groom their horses, and begin the ordinary out-of-door business of the farm. The adoption of this arrangement obviates the necessity of stopping the ploughs during the usual hours of labour for the purpose of thrashing—an advantage which it is impossible to secure when horse-power is employed. In order to illustrate the actual and relative expense of thrashing and dressing grain in Aberdeenshire by the different methods usually practised, I shall here introduce separate statements of the cost of the process by water, horses, and the flail, on an arable farm of 220 acres, cultivated according to the six-course rotation of cropping, and producing annually about 440 qrs. of grain. In the subjoined calculations we take the wages at the usual winter rates in Aberdeenshire, viz.—a man at 1*s.* 6*d.*, a woman at 10*d.*, and a pair of horses at 8s. per day. We shall suppose the thrashing, &c., to be executed during the ordinary hours of farm-labour in each of the cases referred to. It has frequently been found that it requires eleven days of four men and two horses to cart the unthrashed corn from the stack-yard to the barn. On these data we shall now proceed with our calculations.

1. *Water-power.*—The first cost of the thrashing-machine and its appendages is assumed at 90*l.*, and interest is allowed on this sum at four per cent. per annum. The winnowing machine, also, is driven by water, which saves the work of one man. The whole cost of thrashing and dressing 440 qrs. of oats by water-power may be stated as follows, viz.—

	£	*s.*	*d.*
To 2 horses, 11 days carting corn to barn, at 4*s.* each per day........	4	8	0
To 4 men, 11 days attending do., at 1*s.* 6*d.* each per day...............	3	6	0
To 4 men, 11 days attending thrashing-machine, at 1*s.* 6*d.* each per day..	3	6	0
To 2 men, 11 days dressing 440 qrs. of grain, at 1*s.* 6*d.* per day........	1	13	0
To 1 woman, 11 days assisting at do., at 10*d.* per day	0	9	2
To interest on cost of thrashing-machine, &c.	3	12	0
To annual wear and tear of machinery.	3	3	0
To oil and repairs	1	5	0
Cost of thrashing and dressing 440 qrs.	£21	2	2
„ „ „ 1 qr.			11½

2. *Horse-power.*—The thrashing-machine is a six-horse power, and is worked ten hours per day, during which forty qrs. are thrashed. Four men are required in the barn—one to unbind the sheaves, one to supply them to the machine, one to remove the straw, and one to riddle and remove the grain as it comes from the first fanners. The original cost of the machine and its appendages is assumed at 90*l.* as before.

	£	*s.*	*d.*
To carting corn into barn, as before ..	7	14	0
To 6 horses, 11 days working thrashing-machine, at 4*s.* each per day	13	4	0
To 4 men, 11 days attending do., at 1*s.* 6*d.* each per day...............	3	6	0
To 3 men, 11 days dressing grain, at 1*s.* 6*d.* each per day...............	2	9	6
To 1 woman, 11 days assisting at do., at 10*d.* per day	0	9	2
To interest on cost of machine, &c....	3	12	0
To annual deterioration of do.	3	3	0
To oil and repairs..................	1	5	0
Thrashing and dressing 440 qrs.	£35	2	8
„ „ 1 qr.		1	7⅙

3. *The Flail.*—Corn is generally thrashed by the flail at a certain rate per qr. The winnowing and dressing of the grain commonly require about double the labour which suffices in either of the two former cases. The quantity which a man is capable of thrashing in a day by the flails depends in a great degree on the quality of the corn; but one qr. is allowed to be the usual rate of thrashing per day of ten hours. The following is a statement of the cost, according to the customary allowance per qr. in this district.

	£	*s.*	*d.*
To carting corn to barn, as above	7	14	0
To thrashing 440 qrs. of oats at 1*s.* 6*d.* per qr.	33	0	0
To 3 men 22 days dressing do., at 1*s.* 6*d.* each per day	4	19	0
To 1 woman, 22 days assisting at do., at 10*d.* per day................		18	4
Thrashing and dressing 440 qrs.	£46	11	4
„ „ 1 qr.		2	1⅖

It is proper to observe that the cost of thrashing corn by water-power, as given above, is considerably more than the sum usually incurred, since much of the work is accomplished when the servants would be otherwise unemployed. The charge for the horse-power, on the other hand, is rather under the general expense, as the farmers here rarely or never thrash longer than a few hours together, and much time is necessarily lost by short yokings. The preceding observations on the thrashing-machine, &c., having extended to greater length than was intended, my remarks on the other machines belonging to or employed in the barn shall be as compendious as possible.

Winnowing-machine, or Fanners.—It appears that the first winnowing-machine employed in Aberdeenshire was imported from Leith in 1783, and that, so highly was its usefulness estimated even at that period, that not many years elapsed till there was scarcely a farm of any note in the county unprovided with one. A fanner is almost invariably connected with the thrashing-machine (motion being communicated to both by the same impelling power), the function of which is to separate the grain from the chaff, &c., previous to its appearance in the corn-barn. A second fanner, of a somewhat different form, though essentially similar in the main features of its construction, is employed for dressing or finally preparing the grain for market and other purposes. This is also not unfrequently driven by the same power that propels the thrashing-machine, especially where an abundant supply of water is available, motion being communicated to it in the usual manner by means of a leathern belt extending from some part of the machinery. Within the last few years various alterations, and, no doubt, some improvements, have been effected in the construction of the winnowing machine; but no deviation from the general principles has been made; and therefore it is presumed any further notice would be superfluous.

The Hummeller.—Every corn-barn is furnished with a hummeller, for removing the awns from the grains of barley and bear. This instrument is of various sorts. On the smaller class of farms, handhummellers are commonly employed, which are either of a square or circular form, and consist of a number of parallel bars of iron fixed to a frame of the same material. The barley to be hummelled is placed upon the barn-floor, and is freed from its awns by repeated strokes of the instrument. Another description of hummeller, which is very commonly employed in this county, consists of a fluted drum-cover, the diameter of which is half-an-inch greater than that of the drum. The number of flutes varies from thirteen to sixteen, and they are placed at intervals of 1½ inch. Their length is the same as that of the drum. A space of about six inches in width, adjoining the feeding-rollers of the thrashing-machine, is necessarily unfluted, and, by means of a simple contrivance, it can be elevated or depressed as may be found necessary. This sort of hummeller has been in use in this district from a remote period. It costs very little, and is sufficiently effective for ordinary purposes, but occasions some additional work. It is more generally employed in this county than any other kind of hummeller. Another instrument, which is now much used for the same purpose, consists of a cast-iron box about two feet in length, one foot three inches in diameter at one end, and one foot at the other. The box is divided into two halves, the uppermost one being three-sided, the lower circular; and both are firmly screwed together with bolts. The barley to be hummelled is conveyed into the box through a small hopper at the top, and the awns are broken off by the action of a number of flat, thin blades of iron attached to a spindle or shaft of malleable iron revolving within the cylindrical box at a high velocity. The spindle is an inch square; the blades, of which there are two opposite rows, are one inch in breadth by ¼-inch thick, and tapered somewhat towards the points. the velocity of the spindle and its attached blades is 700 per minute. This kind of hummeller is so placed in relation to the thrashing machine as to receive the grain directly from the first fanners. The usual price of this apparatus is £3 3*s*. The several operations of thrashing, hummelling, and winnowing always proceed simultaneously when barley or bear is being prepared for the market or for seed.

The other instruments occasionally worked in connection with the thrashing-machine are a corn-bruiser and a churn. The former apparatus is employed in bruising oats for horses—a practice which is found to effect a considerable saving in the quantity of grain required for feeding. When a sufficiency of water is available, a churn is not unfrequently worked by this power, and with much convenience and advantage. A separate water wheel of small dimensions is sometimes used for this purpose, so that the operation of churning may be at any time carried on independently of the thrashing machine and its wheel.

IV. WHEEL CARRIAGES.—The length to which my remarks on the various instruments included under the foregoing heads have extended forbids anything approaching a description of the carriages employed for farm purposes in this county. Nor is a detailed account at all necessary, as they present few peculiarities of construction, and differ but little from those in common use throughout Scotland. The one-horse coup-cart is that most generally employed; but the double-horse cart is also occasionally used in conveying dung to the fields in winter, when the roads through most farms are not often of the best description. It is to be observed that the sparred corn-cart, so generally employed in the Lothians and other parts of the south of Scotland during harvest, is almost unknown in Aberdeenshire, the common coup-cart being made to answer the same purpose by attaching a moveable frame to it.

It may not be out of place to notice under this head a liquid-manure cart of a very approved construction, which was invented a few years ago by Mr. George Morice, Kenmuck, near Keith-Hall. The cask for containing the liquid is mounted upon an axle and wheels, which are attached in the usual manner to a pair of shafts. The machinery for maintaining the cask always in a horizontal position, and for regulating the discharge of the liquid, is both simple and ingenious. At the foremost end of the cart is fixed what is technically termed a "bridle," with a mortice in its centre, in which works an upright bar of iron perforated with a number of holes, and fastened to the cross-bar of the shafts. Attached to this bridle, and within reach of the driver, is a lever, by means of which either end of the cask can readily be elevated or depressed to suit the irregularities of the ground, or in travelling up or down hill. From the circumstance of the cask being maintained in a horizontal position, the weight on the horse's back, as well as the pressure on the discharging apparatus, is always uniform, however uneven may be the surface of the ground. The apparatus at the posterior end of the cask, for regulating the flow of the liquid, is also very simple and effective. The discharging orifice is furnished with a "shutter," which is opened to any required extent by means of a short lever, and attached to it is an iron pipe for conveying the liquid into the spreading box. This short pipe is closed at its outer extremity, but is provided with two apertures, one on each side, through which the liquid, in escaping from the cask into the spreader, diverges equally to both sides. By means of the lever and shutter, the flow of the liquid can be regulated to any required quantity, while the perforations in the bottom of the spreader admit of being widened or narrowed, as may be found necessary. The spreading-box is commonly seven and a half feet long, but can be made to any required length, and is easily detached from the cart after being used. The wheel-rims are five inches in width, that the grass may not be injured or cut up, and the axle is curved downwards to allow the cask to be kept as low as possible. The weight of the whole cart when the cask (which contains 118 imperial gallons) is full, is 19 cwt. This liquid-manure cart has obtained a prize at each of the annual competitions of the Aberdeen, Banff, and Kincardine Agricultural Association. The inventor is at present attempting some further improvements. The price at Aberdeen is £10 10s.

I have thus, in a rapid and necessarily imperfect sketch, endeavoured to convey some idea of the principal implements and machines employed by the farmers of Aberdeenshire. To have entered more minutely into descriptive details would have extended this article beyond reasonable limits; I have therefore omitted even to name some useful instruments of different kinds; but the more important of these shall be adverted to when we come to notice the operations in the execution of which they are employed. From the cursory observations that have been made, it will be perceived that the farmers of Aberdeenshire are, upon the whole, pretty well provided with useful and effective implements, though it is admitted that in this respect they are still considerably behind those of some other localities north of the Tweed—a circumstance which unquestionably is attributable in a great degree to the prevalence in this county of small possessions.

AGRICULTURAL AND SCIENTIFIC TRAINING SCHOOL,

KENNINGTON LANE, LAMBETH, NEAR LONDON.

LECTURES ON THE APPLICATION OF CHEMISTRY TO AGRICULTURE, AND ANNUAL EXAMINATION OF THE CHEMICAL STUDENTS.

BY J. C. NESBIT, ESQ., F.G.S., M.C.S.L., &C.

Lecture III.—On Carbon, Hydrogen, and Nitrogen.

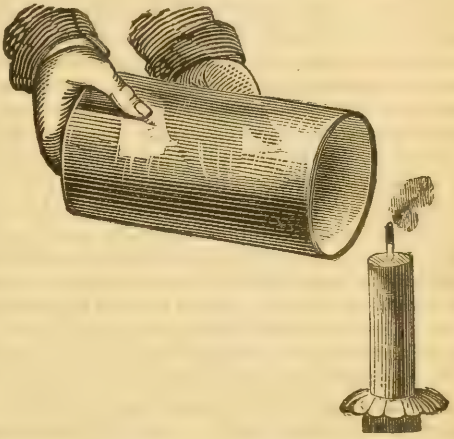
On Friday evening a numerous and highly respectable company, composed of the parents and friends of the pupils, with a number of scientific gentlemen, assembled in the School-room, Kennington-lane, for the purpose of hearing a lecture on Agricultural Chemistry from Mr. Nesbit, and to witness the annual examination of the chemical students. We have, on former occasions, had to report the examinations of the pupils as having been very satisfactory to their parents and friends; but we believe that the knowledge of chemistry exhibited on this occasion by the pupils to have been much more sound and extensive than on any former occasion.

Mr. Nesbit commenced by saying: Ladies and Gentlemen,—I have very great pleasure in appearing before you this evening, for the purpose of explaining a few of the principles of chemical science, and showing you that these can be understood by children, and instruction can be given in them, following the common course of education, without taking anything away from the usual studies, such as languages and mathematics. This lecture is one of the course which I am delivering to the youths before you, on agricultural chemistry; and I thought that I could not do better than give you a specimen of what we do with those youngsters every week, and I shall now address myself to them; for I think I could not do better than show you the manner in which I deal with them. In the last lecture I showed you the agency of oxygen, and that by its action all substances (vegetable and animal) were decomposed and reduced into their original components. Hydrogen, carbon, and nitrogen are the elements most subject to the action of oxygen. Carbon, or charcoal, is a substance with which you all are familiar. It occurs, united with hydrogen, in the form of coal; and diamond is only charcoal in a state of purity—in other words, diamond is only crystallised charcoal. There are some other forms of charcoal which are very singular: for instance, plumbago; or, as it is called, "black lead." But there is no lead whatever in it; for it is only charcoal containing a small quantity of iron. You are aware that diamond is the hardest of all bodies, and that it is only another form of charcoal. Here is a piece of charcoal from the common gas works. When gas is liberated from coal, it ascends to the top of the retort, and the charcoal or coke is left below. But if the retort be too highly heated, the charcoal from the gas itself becomes deposited on the upper surface of the interior of the retort, and in this state it is harder than steel. Here is a specimen. It will take the teeth out of a file. It is nearly as hard as diamond; and the teeth of a common file will not touch it. It scratches glass; and it approaches more nearly the state of a metal than to any other. This substance is found also in chalk, which is a combination of calcium and oxygen and charcoal—that is, it is a carbonate of lime—and charcoal occurs also in the various forms of limestone. Now, all combustible bodies will burn wherever oxygen is present; and when charcoal is raised to a certain temperature, the oxygen will act upon it easily. If the carbon be very porous, a small amount of heat is sufficient to act upon it; but as it becomes harder it requires a higher temperature to ignite it. For instance, diamond requires to be raised to a white heat before the action of the atmosphere will affect it. So, also, the hard coal, called "anthracite," will not burn in a common fire-place. But you know that in a furnace it burns very well, because the rapid stream of air passing through the fuel is able to maintain a more intense heat than a common fire-place can. The effect of oxygen upon all substances (animal and vegetable) containing carbon is to decompose them eventually, unless something occurs to prevent its action and to liberate the charcoal in the form of carbonic acid gas. This gas is composed of oxygen and carbon. Chalk is carbonate of lime, containing twenty-two parts in fifty of this acid. Carbonic acid in the form of a gas is 1½ heavier than air. We can liberate this gas from chalk, or carbonate of lime, by the action of a strong acid; and we are thus able to examine its properties. You are aware that when it is liberated, as in the making of some drinks, it produces a brisk effervescence. This effervescence is caused by the gas making its way through the fluid in escaping, and it gives a beautiful taste and sparkling appearance—as you well know in soda water, champagne, and porter. It is this gas that gives the beautiful taste to good fresh beer and to spring water. This gas is found in the ground in various situations in different parts of the world, especially in volcanic districts. For instance, in the Grotto del Cane in Italy, this carbonic acid issues continually from the mouth of the grotto, and covers the bottom to the depth of two feet. A dog, not being high enough to breathe above the surface of the gas, dies immediately; but a man, being so much taller, walks into the grotto with perfect ease and safety. This gas is equally destructive to all animal life, and the dog perishes by breathing it, whilst the man escapes by having his mouth above it. This substance, being heavier than air, finds its way into wells. Men often die upon going into old wells before they have taken care to ascertain whether carbonic acid is absent; but even in new wells this deleterious gas is sometimes present. To mention a recent instance—only a few years ago, Messrs. Sharpe and Roberts, of Falkener-street, Manchester, were sinking a new shaft, and carried it down twelve feet the first day. The next day, when the work was to be gone on with, the men thought of no danger, as the well was of such recent formation. No gas was expected. One of the men jumped into the well, and he suddenly fell down. One of the others followed to save him, and fell down also. A third went down with a rope round him, and brought up the other two; but they were both dead. The gas had not been there the night before, but it accumulated in the mean time from some unobserved local causes, and the destruction of life was the consequence next day. This gas, indeed, is not only destructive to animal life, but you will see what effect it has upon a lighted candle. You see that is instantly extinguished; and so we find, that wherever a lighted candle will burn, there is no need to dread the extinction of animal life.

This gas may be poured from one vessel into another, it is so much heavier than air. I will pour some of this invisible gas into this glass jar, and then immerse in the gas a lighted candle, which will be immediately extinguished (experiment performed). If I pour a jar full of this gas over the lighted candle, it will also be extinguished.

Fig. 1 shows the manner of performing this experiment.

(Fig. 1.)



You have all heard of explosions in coal mines: you have heard of certain gases—not this one, taking fire, and exploding; but it is not the explosion that generally kills, but the product of the explosion. The gas which explodes is the light carburetted hydrogen, composed of hydrogen and carbon, the carbon of which in the explosion unites with the oxygen, which it meets, and forms carbonic acid. This is the gas which results from the explosion, and it is more feared by the miners than the explosion itself. It is the choke damp. The explosive gas is called fire damp. You perceive that when a lighted candle is exposed to a stream of carbonic acid gas, it is immediately extinguished; and from this you will know, that in all cases where old wells are to be emptied, a lighted candle should be sent down first; and if that be extinguished, the gas is present which is fatal to animal life. If the candle continues to burn, a man may descend with safety. The carbonic acid is very important to vegetables. It forms a considerable part, as it is from this gas, as it exists in the atmosphere and taken up by the roots, that plants obtain their carbon.

Before mentioning the action of vegetables in decomposing this gas, I shall first allude to the production of this gas from various sources. I have before mentioned that this gas is given out in fermentation, combustion, &c., and that all vegetable and animal substances, when acted upon by oxygen, give out carbonic acid. This gas is very easily detected by its action on lime or baryta water. When brought in contact with either of these transparent liquids a heavy white precipitate is produced. I will now ignite this fragment of paper, and hold an inverted tumbler glass over the flame, so as to catch the gas or smoke produced by the burning. I then suddenly cover the mouth of the glass with my hand, and pour in a small quantity of baryta water. An immediate white precipitate you perceive is the consequence, indicating that in the combustion the charcoal of the paper has assumed the form of carbonic acid gas. The production of this gas from other sources may be proved in a similar manner, as from common coal, decomposing manures, burning wood, &c.

Oxygen is also the source of heat in animals. There is no subject more beautiful for the consideration of human science than the inquiry how animals sustain in winter and summer a certain degree of temperature, how in the greatest heat of summer the animal temperature is below that of the surrounding atmosphere, and in the cold of winter is above it. You know that if we look to the stove, we see that it derives its supply of heat from the fuel put into it. We are similar, in some respects, to the stove; we take in air and food, and if we stop the supply of either, we stop life as well. It is now satisfactorily proved that animal heat is produced in consequence of the action of oxygen upon the carbon of our food; and as we want to generate more of that heat in winter than in summer, it is consequently evident that we require more food in winter than in summer, in northern than in southern climates. In tropical climates much less food is required than in polar regions. Look to the digestion of the Esquimaux, and others who inhabit the most northern regions, who will consume eight or ten or twelve pounds of whale blubber in a day, and drink with relish a gallon of train oil as well. Look to the Hindoo, who in a tropical climate is satisfied with a handful of rice; and yet they both live well. But the food of each is adapted to his climate. If the Hindoo were removed towards the north, he would gradually acquire as great an appetite as the Esquimaux, and would do as well upon it. You will, then, perceive how necessary it is to proportion the amount of food on which the oxygen may act to the temperature of the climate or the season.

You, gentlemen, who are engaged in agriculture, will see of what great importance this matter is, when you have to consider how to obtain the greatest amount of flesh and fat in winter and in summer. You will recollect that the amount of food which in summer goes to make fat, is required in winter to be consumed for the supply of heat.

I will now give you an evidence that the combustion of charcoal is regularly going on in our system.

I will take this small ale-glass, containing a little lime water. I will now, by means of a common pipe, breathe a few times through the liquid, when you will immediately observe the characteristic—a white precipitate (experiment performed).

The carbonic acid given out of the lungs of animals is, therefore, another source of supply to the atmosphere.

In the atmosphere, whether it be taken at London or on the summit of Mount Blanc, there is, with the minutest variation, but one five-thousandth part of this gas; and yet it is from that quantity all vegetable bodies take their supply. There is little difference where the atmosphere is taken, the average proportion is the same—about two cubic feet in 10,000. From this all the vegetables derive their carbon. If you plant an acorn in the ground, in the course of one hundred years it will have grown up into a great oak: it will have struck out roots, and sent forth boughs and leaves: it will go on putting them forth for centuries, and the earth will have become no poorer in carbon than it was before, but even richer, from the fall of the leaves. Its carbon could not come from the earth, where we know it is not contained, nor from water, which is composed of oxygen and hydrogen. It could, therefore, only be procured from the airs of heavens, all parts of which are pervaded by it; but the tree has no power unless the light of day acts upon it: by the action of the sunshine every leaf absorbs carbon and gives back the oxygen. Perhaps you are not aware of what an immense surface of leaves a good sized oak-tree presents to the atmosphere, always engaged in absorbing carbon and giving back oxygen. It is not less than many hundreds, or even thousands, of square yards.

There are many vegetable compounds arising from the union of carbon and hydrogen, some of which have a strong perfume, such as oil of roses, or "otto of roses," spirits of turpentine, &c., &c., from both water and carbonic acid. In these all the oxygen has been elminated, but in some others a portion of the oxygen has been retained.

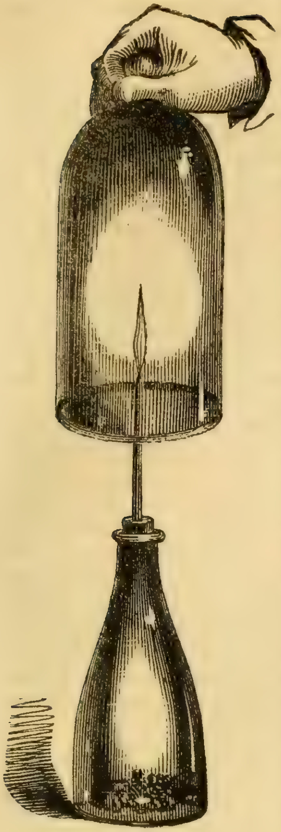
I shall now proceed to HYDROGEN, which is the second of the substances which I spoke of at the commencement. Hydrogen is one of the substances of which water is constituted. In that combination there are two volumes of hydrogen to one of oxygen. That is the proportion as to bulk; but there are eight pounds weight of hydrogen to one pound weight of oxygen, hydrogen being sixteen times lighter than oxygen; therefore, being in the proportion of two to one in bulk, its weight will be only one-eighth of that of the combined oxygen.

Hydrogen is the lightest body in nature: it is fourteen or fifteen times lighter than common air, as we see illustrated by the ascent of the balloon (experiment).

Hydrogen may be easily separated from water by other substances, such as potassium, which has a powerful affinity for the oxygen. I will drop this small piece of potassium on to the surface of this bason of water. You see that the potassium has become red hot from union with the oxygen of the water, while the liberated hydrogen burns on the surface (experiment performed).

In this case the hydrogen was liberated, but it was burnt at the moment of its liberation.

(Fig . 2.



We will take another case, in which we will liberate hydrogen, but without the production of an amount of heat sufficient to ignite it: it will be liberated, but not ignited. I will mix some common oil of vitriol with water, and pour the mixture over the fragments of zinc contained in this common wine-bottle. I then insert a cork with a piece of common tobacco pipe fitted to it. An effervescence arises in the bottle from the excess of hydrogen. After the atmospheric air has been driven from the bottle, I will apply a light to the issuing stream of gas. You perceive it immediately ignites. The gas thus ignited is uniting with the oxygen of the air, and the result is, water, which you are all aware is composed of oxygen and hydrogen. To show that this is the fact, I will hold a cold glass over the burning jet, when you will see an immediate deposition of moisture. Fig. 2 explains the manner of performing this experiment.

Hydrogen, in common with other combustible bodies, will not burn without air. If mixed with air, it will explode with violence on the application of a light, and if not contained in a vessel of great strength would shatter it to atoms. A gasometer full of common gas might be made red or white hot without the possibility of an explosion. I will mix in this strong bottle one part of oxygen and two parts of hydrogen, which are the proportions by volume necessary to form water. I will then wrap a towel round the bottle to prevent the pieces flying about in case of accident, and apply a light. [An instantaneous and violent explosion was the immediate result.]

Hydrogen being much lighter than common air, is used for the purpose of inflating balloons. For the sake of cheapness the common coal gas, though heavier than pure hydrogen, is now generally used. I will fill this small balloon with pure hydrogen, and then allow it to ascend (experiment performed). The balloon ascends because it is less attracted by the earth than an equal bulk of air; that is, it is lighter than an equal bulk of air. The air, therefore, will take the lowest place, and will force the balloon upwards until it arrives at a stratum of air of the same specific gravity as itself.

Hydrogen is found in all vegetable and animal substances. The gas used in illuminating the streets is made from coal. Coal is, as you are well aware, the remains of vast forests of primeval times, which have, by time and immense pressure, been changed into the form of coal. Hydrogen gas, containing some charcoal in solution, is given out in most coal-pits, and constitutes the dangerous " fire-damp." If the mines be not exceedingly well ventilated, so that the gas is removed as fast as liberated, it mixes with the air of the mine; and, if a naked light be brought near by the careless miner, an awful explosion is the immediate result. These explosions are very often attended with a lamentable destruction of human life. The common street-gas is made by heating coal red hot, when the hydrogen unites with a portion of the charcoal of the coal, and is liberated. The illumining power of gas depends, as Sir Humphrey Davy has shown, on the amount of charcoal contained in it. He ascribes the light thus liberated to the solid particles of charcoal in the ignited flame being intensely heated, and reflecting the light. A gas may be made so hot as to make red hot, or even white hot, a solid body immersed in it, and yet not displaying any light itself. The illuminating power seems to depend on the presence of some solid body. If hydrogen, which of itself burns with a very pale flame, be sent through a tube containing a sponge moistened with naphtha (which contains a large amount of carbon), a portion of the naphtha will be dissolved by the gas; and, on igniting the issuing gas, it will burn with a splendid white flame. (Experiment performed.)

Vegetables derive their hydrogen from water. The water taken up by the roots is sent into the leaves, and exposed to the light of the sun; the hydrogen of the water is retained by the vegetable, while the oxygen is liberated.

NITROGEN, the third element of which I spoke at the beginning of the lecture, is widely diffused through the air; of which it constitutes four-fifths of the bulk. It is found in all plants and animals. It exists in coal, in saltpetre, in ammonia; and you find it in the ladies' smelling-bottles. In that form the ladies are best acquainted with it.

This nitrogen is contained in all animal bodies. If you feed animals on food that does not contain it, they die. Nitrogen is necessary to form the tissues of animal bodies, and it therefore is necessary that vegetables should contain it. The two most remarkable compounds of nitrogen are—one with oxygen, called " nitric acid;" the other with hydrogen, and called " ammonia."

The nitrate of potash (a compound of nitric acid and potash), or saltpetre, is found in the plains of India, upon the surface of the fields, in the form of an efflorescence.

In South America nitrate of soda (a compound of nitric acid and soda) is found in large quantities. There are no natural beds of the nitrate in this country; but they can be produced from the decomposition of animal substance by artificial processes. In the times of Charles the Second saltpetre was obtained, for the purposes of war, from the scrapings of old walls, and the bottoms of stables. It is manufactured from refuse animal matters, the straw of stables, and excrements—exposed to air, and mixed with lime. After long exposure, these substances are put into large vats, and mixed with water and wood ashes. The water is then evaporated, and furnishes crystals of nitre.

In the late war with the French, when we cut off their supplies of nitre, and took their possessions in the East Indies, from which they derived them, the chemist, Chaptel, was called in, and he devised methods of procuring it from old stables. In this he had employed under him 70 or 80 young men, and sent one to each department. By their exertions enough of saltpetre was obtained to supply the whole army, from the beginning to the end of the war. It is important in agriculture to have substances containing saltpetre, because all plants grow the better where saltpetre is given to them in not too great an abundance.

Ammonia, a compound of nitrogen and hydrogen, seems the compound which nature chiefly makes use of to furnish nitrogen to plants.

Ammonia is contained in the air, and every shower which descends brings with it a portion of this valuable substance, for the use of the vegetable world. There can be no doubt that all wild plants obtain their ammonia from this source. But though even with cultivated plants more ammonia may thus be conveyed to the soil in a year than they take out in a year, yet it may not be conveyed at a time when the plants most require it. An artificial source of ammonia in the soil is, with proper regulation, doubtless of great benefit. Guano, rags, horn shavings, &c., are all capable of supplying ammonia to the soil. But great care should be taken in the use of these manures. If a farmer should manure his soil with these alone, without a proper amount of mineral matter, he would undoubtedly deteriorate his soil; they should, therefore, always be mixed with manures containing much mineral matter—such as wood or peat ashes, used as an adjunct to farm yard dung, or alternated year by year with other manures, containing the necessary amount of inorganic matter.

The decomposition or putrefaction of all vegetable or animal matters containing nitrogen always furnishes ammonia. Thus urine after some time has a strong ammoniacal smell. A badly ventilated stable always smells strongly of ammonia in the morning, from the decomposition of the animal excrements. Formerly sal ammoniac used to be made from camel's dung. It is now a product of the decomposition of coal (vegetable matter), by heat in the making of gas.

The dung-mixens in fermenting give out ammonia in a volatile form, and unless some means be taken to stop its escape, it will serve to manure the whole neighbourhood instead of the farmer's own land. It may be prevented from escaping by the addition to the midden or dung-heap of a quantity of finely powdered gypsum. In making the mixen, a layer of dung twelve or fourteen inches deep ought first to be placed on a proper bottom, then a few pounds of gypsum strewed over, then another layer of dung, then gypsum, &c. The whole ought to be covered with a layer of mould, four or five inches thick. It is very improper to mix lime with manures of any kind. The consequence is, the immediate liberation in a volatile form of all the ammonia, to the great detriment of the farmer. As an illustration I will add to this sample of Peruvian guano, which is almost without smell, a quantity of quick lime. A powerful odour of ammonia is immediately produced. (Experiment performed.)

We now have in this course of lectures mentioned the principal properties of OXYGEN, HYDROGEN, NITROGEN, and CARBON, the four elements which constitute the organic parts of vegetables and animals. It is wonderful to observe how the wisdom of the Almighty is displayed in every portion of his vast dominions. We have seen that vegetables derive their supplies of oxygen, hydrogen, carbon, and nitrogen, from *water*, *carbonic acid*, and *ammonia*. How wonderful, therefore is it that the decomposition and putrefaction of vegetable and animal matters should result in the reproduction of water, carbonic acid and ammonia; the destruction and death of one generation is thus by the wisdom of God made to provide for the sustenance and life of another.

No sooner does an animal cease to exist, or a vegetable begin to decay, than the sources of new life are afforded, with all that is essential to keep up a ceaseless round of living and sentient beings.

Having thus shortly reviewed the properties of the organic elements of nature, we shall in our next course commence the consideration of inorganic or mineral constituents of the animal and vegetable kingdoms.

Before I conclude, allow me to address to you a few words on chemistry as a branch of education. It is only recently that chemistry has been thought of as a branch of general education; and notwithstanding the opinion of several of the most eminent men, that it ought to be so, very few have been bold enough to go out of the beaten track, and introduce it as a systematic branch of education. Mr. Augustus de Morgan (Examiner in the London Hospital) says on this subject, that "the neglect of chemistry in this country as a branch of education will form a curious feature in the history of the world."

It strikes me that in this country, which depends for its greatness on the proper application of its physical resources, the neglect of this science in the education of the young is a very great anomaly. All other studies are introduced before chemistry, and this science in all its bearings is kept in the back ground. We have the opinions of Sir Humphrey Davy and Sir John Herschel, and all the great men of the last fifty years, as to the necessity of chemistry as a branch of general education.

But there are persons who say, that it is impossible so to introduce it. They say "We should only have bottles broken, acids spilled, and clothes burnt." But I can show that it is possible to study this science without any such evils as the burning of clothes or fingers, and without any very considerable cost. I am sure you will allow that chemistry is of value, and I shall now show that the knowledge of this science may be acquired by even young boys. I shall produce before you some of our pupils, who are not only acquainted with the nature of most of the elementary bodies, but are familiar with analyses, both qualitative and quantitative. A great number of original analyses have been made by the pupils this session, many of which have already been published in various journals. The tables of analyses which you here see will clearly prove that with proper attention this branch of chemistry may easily be acquired.

I.—*Analysis of the inorganic matter of farm-yard manure.*

	Farm Yard Manure from Kent.	Farm Yard Manure from Surrey.
Per centage of Ash	9.2	9.6
Silica....................	79.79	71.32
Potash	3.32	5.14
Soda	0.92	1.68
Lime......................	6.90	12.32
Magnesia	0.56	0.82
Common Salt	1.43	1.22
Phosphate of Iron	2.04	2.03
Phosphate of Alumina......	1.53	2.54
Sulphuric Acid............	1.89	1.57
Phosphoric Acid	1.58	1.27
Manganese	a trace.	
ALLEN AND GREENHILL.	99.96	99.91

II.—*Analysis of two samples of guano.*

	Peruvian Guano.	Ichaboe Guano.
Moisture	15.50	25.50
Ammonia	12.85	9.60
Organic Matter	38.95	32.40
INORGANIC MATTER.		
Silica....................	1.30	.44
Potash	3.21	4.19
Soda	.48	.34
Chloride of Sodium	2.03	1.61
Lime......................	17.81	11.55
Magnesia	.39	.83
Phosphate of Iron	.65	.48
Sulphuric Acid............	.42	1.06
Phosphoric Acid	6.38	11.83
ALLEN.	99.97	99.83

III.—*Analysis of peat and wood ashes from Farnham.*

	Peat Ashes.	Wood Ashes.
Silica....................	5.50	4.25
Sand	46.10	10.00
Charcoal	16.85	.35
Lime......................	5.35	29.05
Magnesia	.10	6.65
Potash	..	7.55
Soda	..	4.89
Chloride of Sodium	.40	.80
Chloride of Potassium......	.60	..
Sulphuric Acid............	3.25	3.25
Phosphoric Acid	.60	4.70
Carbonic Acid	2.50	25.00
Phosphate of Iron	..	2.50
Oxide of Iron	13.50	..
Phosphate of Alumina......	..	.50
Alumina	4.40	..
Manganese	..	a trace
ALLEN.	99.15	99.40

The chemical pupils then underwent a searching examination in the properties of the elementary bodies, and the various methods of detecting the presence of sulphur, phosphorus, fluorine, chlorine, &c., potash, soda, lime, baryta, magnesia, iron, manganese, and all the commoner elements. It was really surprising to witness the ease with which the methods of analysis were detailed by the pupils, and the evident practical knowledge which they evinced of the various modes of operation. The more advanced pupils then described the manner of performing quantitative analysis, that is, the ascertaining *by weight* the proportion of the different ingredients in a compound mass. This they performed in a most satisfactory manner, and they detailed also the ways in which they themselves had performed the analyses already published.

The pupils who most distinguished themselves in quantitative analysis were Messrs. Allen and Fryer.

In the qualitative class the following deserve honourable mention: Messrs. P. Copland, L. Hart, T. Greenhill, E. Agate, C. Agate, S. Solomon, E. London, and W. Copland.

A vote of thanks was then unanimously passed to Mr. J. C. Nesbit for his valuable lecture, and the company separated, highly satisfied with the proceedings of the evening.

AMERICAN GROWTH OF WOOL.—A communication from Buffalo gives the following account of the production of wool:—The production of wool has been gradually increasing from year to year, and it is now evident, beyond question, that the amount raised in this country is more than is wanted for home consumption, consequently we must look abroad for a market for the excess. That a fair export trade could be carried on in the article if it can be obtained at a reasonable price, and the qualities are selected with care for their adaptation to the wants of English manufacturers, there can be no doubt. It appears by the statistical tables accompanying the United States census for 1840, that the whole amount of wool raised in all the States and Territories of this country at that time was 35,802,114 lbs. as follows:—

Maine............	1,465,551	Mississippi........	175,196
N. Hamp'sh........	1,210,517	Louisiana	49,283
Massachusetts	941,906	Tennessee	1,060,332
Rhode Island......	183,830	Kentucky	1,786,846
Connecticut	889,870	Ohio	3,685,315
Vermont	3,699,235	Indiana	1,237,919
New York	9,815,295	Illinois	650,007
New Jersey	397,297	Missouri..........	562,265
Pennsylvania......	3,048,564	Arkansas	64,943
Delaware	64,404	Michigan	153,375
Maryland	488,201	Florida	7,285
Virginia..........	2,538,374	Wisconsin	6,777
N. Carolina	625,041	Iowa	23,039
S. Carolina........	299,170	D. of Columbia	707
George	371,303		
Alabama..........	220,353	Total	35,802,114

Within a few years, the production of wool in the Western States has considerably increased, and it is probable that the whole amount now grown in the United States is not less than 60,000,000 lbs. It is estimated that the machinery now in operation in the woollen manufactories in the country would require about 45,000,000 lbs.; that there is used by families about 10,000,000 lbs.; leaving an excess of 5,000,000 lbs. for exportation. This excess, although comparatively small, will, in a great degree, regulate the price of the entire clip. The woollen business in England last season was unusually good, and the prices obtained for wool higher than could now be realized. There has been, too, in our own country, a gradual decline in prices since the last shearing, and but few of those who bought wool at that time of the growers, to be sold in market, have realized the cost of their purchases. From these facts it is evident that the wool of the present year must come to market at a cost of from 5 to 7 cents less than last year's prices. Large quantities of this staple are arriving daily by waggon and railroad; the following are the prices offered:—

	c.
Native (common)	16
¼ blood merino	19
½ do.	22
Full do.	25

Where wool is badly washed, and not otherwise in good order, a deduction is made in the weight.

MR. PARKES'S LECTURE ON DRAINING.

Sir,—There never was a time when it was so important as it now is, that all the practical operations of agriculture should be conducted on correct and sound principles. In no view of the subject of my last three letters is there presented to my mind an aspect of such vital interest as the bearing and influence which the carrying out of my proposition would have on the great question of agricultural improvement. The perplexing variety and discrepancy of the plans which have been put forth on the different points relating to improved cultivation—the absence of any adequate means of testing them—the manner in which plausible and ingenious theories, which set at nought the most valuable experience, are even now received in high places; all go to establish, beyond the power of contradiction, the necessity for putting into motion some such machinery as shall, by moral suasion, control and direct the national mind. As these matters are now managed, an immense amount of capital is annually invested in carrying out theories, and in prosecuting modes of improvement, so called, which, if there had existed a national institution where an enlightened examination could have been taken and an authoritative test applied to them, would have met at once with the fate which they deserved; while all recognized plans would have been so brought out into prominence as to meet with general acceptance and adoption.

As a practical man, not unobservant of what is passing around me, this view of the question of agricultural improvement is necessarily forced upon me; and I am painfully alive to the fact, that if what is understood by the phrase "agricultural improvements" be not carried on upon principles much better considered than they have heretofore been, the loss to the holders of certain inferior soils, which have been frequently designated, will be overwhelmingly extensive.

Having myself, for twenty years continuously, been engaged in the practical superintendence of various improvements which were liberally devised by the hon. member for Malton, on his estates in the counties of Nottingham, Lincolnshire, and Yorkshire, I need not hesitate to say that I have derived considerable advantage from the voice of experience; and if there be one lesson which more forcibly than others has been impressed on my mind, it is the conviction that, in the application of new principles to the improvement of the soil, sufficient attention has not been paid to the speakings of experience. This has been peculiarly the case with regard to DRAINING, the subject which Mr. Parkes has, with so much ingenuity, recently brought before the Royal Agricultural Society of England.

I do not now refer to the thousands of cases where landlords, imperfectly estimating the advantages of improved cultivation, have, with some liberality, bestowed tiles on their tenantry, on condition that the latter would, according to their own views and judgment, put them into the ground; for this wild and pernicious practice has received an effectual extinguisher in the removal of what has been called "protection." Gentlemen will not henceforth squander their money to any great extent in this way; but there are proofs every where existing of extensive works being carried on, which are either regulated by no fixed principles, or are based upon erroneous views. Of such a character have been many of the plans which have come before the public eye, through the medium of agricultural journals, not excepting that of the Royal Agricultural Society itself; and, if I do not mistake his meaning, such is the system which has been recommended for adoption by Mr. Parkes. While reading his well-written and ingenious lecture, I could not help thinking that there would be several gentlemen among his auditory who would, like myself, wonder much at the strange mixture and confusion of theory and practice which he exhibited; but most of all would they be puzzled, as I am, to ascertain to what *genus*, as a drainer, Mr. Parkes belongs; whether to the class of *deep drainers* or that of shallow drainers. I cannot but express my surprise and regret that one of the Messrs. Parkinson, of Notts, who could have given a clear and correct exposition of the system of *deep draining*, did not, by the development of their own practical and enlightened views, elicit those of Mr. Parkes upon the real question of freeing certain kinds of wet land from *springs*, and the effect of spring water. As far as can be gathered from his lecture as reported, I humbly think, unless I have misunderstood him, that his system would frequently leave the water, which he professes it to be his object to take away, *just where he found it*, while it would fail to act upon the rain which falls upon the surface, with a tithe of the benefit which would arise from the application of the "*Deanston system.*"

I am happy in knowing that it is the intention of Mr. Smith to place the subject of draining before the public, in his own practical way, and that shortly; and, in the mean time, I trust that it will attract the attention of the gentlemen in the county of Notts, whose names I have ventured to mention, and who are better qualified than any other practical agriculturists of the present day, to enlighten the public mind on the very difficult question of *deep draining*. Should no other person take it up, I shall, in a future letter, again recur to it.

I am, sir, yours truly,

July 29, 1846. J. WEST.

P.S.—The manner in which Mr. Parkes speaks of "deep draining" and "shallow draining," inevitably leads to the conclusion that he has not come into acquaintance with the extensive operations of those proprietors, who most undoubtedly take rank as first-class drainers—I mean the Duke of Portland, Earl Manvers, the Duke of Newcastle, the Earl of Scarbro', J. E. Denison, Esq., M.P., &c., &c.—for if he had, he could not have failed to perceive that the objects and application of the two systems are as distinct as any two things well can be. If he has not arrived at this result, I humbly conceive that he could not do better than pay a visit to the estates which I have mentioned, as a preparatory step for giving to the agricultural world another lecture on draining. He will find no difficulty in getting introductions to the very men who have originated and carried out under the distinguished proprietors alluded to, some of the most splendid instances of regeneration from a state of waste which could be found in the kingdom; and with his powers of collating, comparing, and bringing out facts, I do not doubt but he will produce an essay on draining which will greatly add to his already high reputation.

YORKSHIRE AGRICULTURAL SOCIETY.

LECTURE DELIVERED BY MR. JOHNSTON AT THE PUBLIC BREAKFAST, WEDNESDAY, AUGUST 5.

Professor JOHNSTON remarked that he had not risen so much to deliver a formal lecture as to give an opportunity to gentlemen present to state the result of the different experiments they had made. Facts might be different, and observations might be different; but one fact or one observation did not contradict another fact or another observation. The difference was in the conclusions that were drawn from them. One gentleman, from the observations he had made, might say that guano was of no use, but that was an error of opinion; the fact upon which he had founded that opinion did not contradict the fact upon which another gentleman might have formed a totally different opinion. Both facts might be true; but what they wanted was some principle which would explain both. One thing he particularly wished to impress upon them was that in the present condition of agricultural science they should let their opinions hang loosely upon them and not adhere to them as heir-looms. There was no opinion on the subject of agriculture which was not susceptible of modification, and made applicable to advancing knowledge. With regard to guano it was well known it was derived from a description of sea-fowl which lived on fish, and which was produced in great abundance. If they fed some fowls on the ordinary food, and others on fish, they would find that the manure of the latter was much more valuable than that of the former. There was another fact with regard to the manure of birds generally. It was well known that the excrements of animals, of cows, horses, sheep, &c., consisted of solids and liquids. In the solids were found the phosphates; from the liquids ammonia was obtained, or at least the nitrogen which formed ammonia on fermentation. Now in the excrements of the sea-fowl and other birds the liquids and the solids were ejected together, and consequently it was more valuable. This was an important point. Hitherto only the solid excrements of animals had been really attended to; but they did not contain all that the farmer wanted; they did not contain the ammonia and saline qualities which the liquids carried off. It was not necessary that he should say much on the theoretical advantages of guano, nor was it of much importance to them; but they would find from the market-value of its main constituents in what its advantages really consisted. Ammonia was the principal fertilising ingredient, and the price of that was from 30s. to 4*l*. per ton. In guano there was 55 per cent. of ammonia, and a large proportion of phosphate of lime. These two articles constituted the great proportion of guano, as well as the most valuable in the market. He had already told them that the sea-fowl ejected in one excrement both ammonia and the phosphates; whilst in animal excrements, the phosphate was contained in the solid and the ammonia in liquid. He would draw attention to some of the varieties of guano which had recently come into the market, in order that they might compare them with those which had already come into use. These varieties had been brought from Saldanha Bay and Patagonia. The former variety contained seventy or eighty per cent. of phosphorus, and was very rich, and the Patagonian guano was as good as the better qualities of Ichaboe guano. It was a subject of congratulation that on the coast of Patagonia there was a very large supply of guano, and he hoped that the guano from all parts of the world would last the farmers as long as they would require it; and that by the time this manure failed they would be able to dispense with it. He thought it a most gratifying circumstance that Providence had thus interfered to cause knowledge in these matters to flow in the right channel (applause). When guano failed, still the use of artificial manures would not stop. He anticipated that artificial manures would then be prepared, if not by manufacturers, at least by the farmers themselves, many of whom would be able to prepare them. Their business at present, however, was with guano as they found it. Three or four hundred weight of guano was equal to twenty or thirty tons of farm-yard manure. He had stated its theoretical value, and if the time would have permitted him to explain all the things the plant requires, he could have shown them that this guano, to a great extent, supplies all the demands of the crop. The result of his inquiries in the country had shown that it was better husbandry to use half guano and half farm-yard manure; or if they did not do that, to use guano the first year and farm-yard manure the next. But, in his opinion, the safest way, in all cases, would be to use half dung and half guano, as larger crops, generally speaking, had been obtained in this manner. He thought it was not the best or the most economical method to use guano in a dissolved or liquid state. He then alluded to the great analogy which exists between guano and bones, explaining, however, that guano acts more quickly than bones. He next noticed some experiments which had been made in Ross-shire, Scotland, with guano. A gentleman named Ross, who resides in that county, which contains some as good land and as good farmers as in Yorkshire, wrote to his grieve or bailiff to apply guano to the land in the ratio of four cwt. to the acre. The grieve thinking his employer must be wrong, applied the guano in three several proportions. To one part he applied four cwt., to another eight cwt., and to a third sixteen cwt. The consequence was that on the land where four cwt. were applied beautiful crops appeared, whilst the contrary was the case with the other portions, especially with regard to that portion to which the sixteen cwt. of guano had been applied. Then came the crop of wheat; for wheat was taken after the turnips. When the wheat was growing, where the sixteen cwt. of guano had been applied, the straw was dark coloured, the corn was small in the ear, and when thrashed it was absolutely black. Where eight cwt. had been applied, the sample was a little better, although the straw had a peculiar dark colour. Where four cwt. had been applied the sample of wheat was beautiful, and that wheat brought in the market 6d. per bushel more than the wheat taken from the land on which eight cwt. had been placed, and the wheat taken from the land where the sixteen cwt. had been applied could scarcely be sold at all. He mentioned another case which had been brought under his notice ten days ago, to show the effects of guano in promoting the growth of crops. He then drew their attention to the effects produced on the farm of Mr. Fleming, of Renfrewshire, and gave the result of the money value of three crops, grown in 1842, 1843, 1844, of turnips, oats, and rye, after the application of guano. The crops where guano was applied left a profit, after paying every expense for rent and interest on the capital, of 30*l.* 16s.; where farm-yard manure was applied, at the rate of twenty-five tons for turnips, there remained a profit of 14*l.* 16s., leaving a difference in the profit in favour of the grower, by the application of guano, of 16*l.* In the one case three cwt. of guano was used, and in the other twenty-five tons of dung. The learned professor was here asked what value he put on the manure, to which he replied 8*l.* 15s. He mentioned a few other cases of a similar kind, the result being that more profit was to be obtained from the use of half farm-yard manure and half guano than when they used farm-yard manure only, or when mixed with bones. The question would hereafter be whether they would look to the after effects of guano, or whether they would not rather look to its immediate effects, and whether they would not apply it in smaller quantities from year to year, rather than larger quantities every four years. He believed it would be found more beneficial to apply it to each successive crop, to apply it to the seed, and then to apply a top dressing when the plants made their appearance above the ground. After trying this plan, he thought it would be the most profitable they could adopt. Professor Johnston then sat down amid loud applause.

In the course of his remarks, the learned Professor alluded to the following table, which was placed over the chimney-piece, in large characters:

COMPOSITION OF DIFFERENT KINDS OF GUANO.

	LEVENSIDE.		STAR OF THE BEST.		ICHABOE.	BOLIVIAN.	CHINCHA.
Water	13.75	22.85	13.50	27.66	17.41	8.34	15.90
Organic matter and ammoniacal salts	58.90	52.66	32.31	32.34	55.33	65.60	51.37
Sulphate of soda and common salt	......	......	33.50	9.80	......	......	......
	6.94	6.51	......	......	4.92	0.78	5.00
	......	......	1.58	2.02	......	......	......
Carbonate of lime and magnesia	3.32	2.77	5.81	4.14	3.54	1.12	3.57
Earthy matter	2.83	3.11	1.30	3.88	0.57	4.46	2.39
Phosphate of lime	15.07	12.10	12.00	20 18	18.23	19.80	21.77
	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Mr. **Lister Maw**, of Tetley, near Crowle, rose to make a few observations to the company. He produced several turnips, which he said had been grown on his farm for fold-yard manure. And not only was that particular land in a high state of cultivation, but he had succeeded in bringing other farms, step by step, into an equal state of cultivation, so that they had in fact trebled their produce. He had made some observations last year at Beverley, and he then stated that he had opportunities, which very few in this country had, of making himself acquainted with the manner in which the Incas of Peru carried on their operations. Now, with respect to the relative value of guano, he believed that the Peruvian guano would be found to be the best. And, however much he might respect chemical knowledge as applied to agriculture, and however much they might be indebted (as they undoubtedly were) to such men as the learned professor, he still thought that the chemical affinities and compounds which were going on in nature were not exactly ascertained in the chemical analysis of the laboratory of the chemist. The peculiarity of Peruvian guano was, that it contained no moisture. It was a great peculiarity of that country that no rain fell on the western coast. And the guano of Peru being preserved in a dry state was much better than that of any other country. He believed the same remarks might apply to pigeon manure, and that because it was kept in a dry state in the pigeon cote. Mr. Maw shewed by a drawing the manner of applying guano by the Incas. Another fact to which he alluded was, that at the time the Incas applied the guano to their soil, they had no domestic animals. The lama was the only animal they had; and therefore they could not raise farm-yard manure. And as a proof that even if they had such manure they could not convey it to the land, Mr. Maw referred to his own experience in travelling in Peru, and to the time occupied by him in moving from one part of the mountains to another. He referred to the turnips which he produced as evidence against Professor Johnston, that five or six hundred weight of guano was not equal to fifty tons of manure. He showed that the fold-yard manure was so rich that the fangs had gone out to seek for food, and he thought they had too much. Mr. Maw concluded by stating some interesting details respecting the great growth of turnips without the aid of guano or artificial manures. If the farmers would only raise sufficient fold-yard manure for themselves, which he thought they might do, they would have little occasion for guano. But if not, they might put their hands into their pockets as long as they could for the purpose of raising their crops. He had himself this year large quantities of turnips, rape, wheat, &c., and he had not used an ounce of guano. He had led upwards of a thousand loads of fold-yard manure to his fields, and he had now a thousand loads in hand, which he doubted not he could make good use of in competition with guano (cheers).

H. S. Thompson, Esq., said he quite agreed with Mr. Maw, that farm yard manure was a very excellent thing. The great object of guano was not, he conceived, to dispense with the use of farm-yard manure, but to enable them to carry out the cultivation of a wider breadth of land than could be adequately cultivated without it (hear). With respect to the advantages of guano on present and subsequent crops, he thought there were two things necessary to be considered. The first was the nature of the season, and the next the proper quantity of guano to be applied. By Professor Johnston they had been furnished with instances in which the application of a very large quantity of guano had been detrimental at least to the first crop, while the application of a smaller quantity had been highly beneficial. If more guano were put on than could be taken up by the first crop, of course there would be a portion left for the succeeding crops. If they had a very dry season, and the plant did not appear to derive the whole benefit which guano was capable of supplying, it was manifest that much of its fructifying properties would be left to the succeeding crops. If the nature of the season were taken into account in conjunction with the quantity of guano to be applied, it was very probable that many of the apparent differences of opinion as to the quantity of guano to be applied, and the different effects produced, might be reconciled (hear).

Mr. Thomas Short next offered a few observations. He said he had used large quantities of guano, with various degrees of success. He looked with great jealousy upon the publication of experiments: they generally afforded little information from which a just conclusion could be drawn. He thought it requisite in all experiments made, that in the first instance the constituents of the soil, previous to the application of the manure, should be ascertained, and in the next place the constituents of the plant intended to be cultivated. Some soils contain within themselves many of the requisite ingredients of manure, and might, if their nature were not ascertained and understood, be overcharged with manure, which he was convinced was quite as bad as leaving the soil in want of it. From experiments made by himself, he had come to the conclusion that guano was better adapted for green crops than grain (hear, hear). He had found, however, that guano was materially improved as a manure in the production of potatoes when mixed with lime. In an experiment in which potatoes were the first and rye the after crop, he had found that bones dissolved in sulphuric acid had a decided superiority over guano. He dwelt upon the importance of the preservation of the manure of large towns. Valuable as guano was, it was in his opinion an article that the British farmer at present could do without. The solid matter contained in human manure was a great deal more valuable than guano. It had been estimated that a town of 15,000 inhabitants was capable of producing annually 270 tons of available manure, which might be made to carry one sheep to the acre; it did not fatten it, because it came out of the field at the end of the summer, he thought rather leaner than when it went in (hear, hear). He was induced to try if he could not improve the grass, and in the spring of this year he applied 3 cwt. of guano to the acre. The application was made in the month of January or very early in February. The subsoil was chalk, which reached within about six inches of the surface. It was a strong soil, with, he should imagine, alumina in it. The guano was put on at the rate of 3 cwt. to the acre. He was rather apprehensive that if it came a dry spring, the whole of this might be lost, and therefore he tried a method for preventing it. He applied in the month of May 1 cwt. of nitrate of soda to the acre. The result of this was that the field was most productive, and instead of one sheep to the acre, the average it carried was about four and a half sheep to the acre, and they had been very much improved indeed in condition, and at the present the field was extremely full of herbage (hear, hear). In conclusion, he inquired of Professor Johnston, whether he thought that nitrate of soda had a good effect when mixed with guano in dry weather?

Professor Johnston had no doubt it would materially assist the action of the guano, but whether it would have any effect in preventing any of the evil consequences of dry weather, he could not say.

W. R. C. Stansfield, Esq., M.P., spoke of the application of guano with tank water, and referred to the remarks made at the last meeting of the society, at Beverley, by Mr. Dickenson, of London, with regard to their use in the cultivation of rye grass. He exhibited a specimen of a crop of Italian rye grass of considerable length, which he said was the fourth cutting this year, and had been produced by a certain proportion of guano with tank water. He had cut his third crop in May, and it had produced at the rate of 16 tons to the acre, green crop. He expected to have three other crops this year, and he mentioned that he had last month thrashed some of the grass, and obtained seeds at the rate of 40 bushels an acre. He stated that rye grass was a favourite food of cows, and so long as it lasted they would eat nothing else. In answer to a question made by a gentleman present, the honourable gentleman said he dressed his land over with the guano and tank water after every crop.

Mr. Wm. Barrett, of St. John's Nursery, Wakefield, said he had made a few experiments with guano on turnips and potatoes as well as nursery and garden stock. He had sowed turnips of twenty-two different kinds, partly with manure and partly with guano. For a long season they appeared to grow alike, but about August those sowed in guano began to take the lead. After various experiments with guano and farm-yard manure, he was decidedly of opinion that, applied judiciously, guano was an excellent manure to be applied in the growth of turnips. He had also used guano in growing all sorts of potatoes, using four cwt. to an acre, and it had answered well in the case of all except one. That was in the case of the early potato called ash-top, for which he had found that manure was decidedly the best, but for all other kinds guano was the most productive. With respect to a remark made by Mr. Short, doubting whether any gentleman present collected all the manure made on his own premises, he could say for himself that he had constructed a large tank, into which was received all the liquids flowing from the pig-yard, the stables, the wash-house, and the water-closet. He carted from it every Saturday morning a ton and a half or two tons of liquid manure, and applied it to various crops with great success. He had undertaken few experiments, but so far as he had gone he considered them decidedly in favour of guano (applause).

Sir **Francis L. Wood**, Bart., next addressed some observations to the assembly, and commenced by heartily complimenting Professor Johnston on the excellence of his lecture. He entered upon a narrative of his own observations of land which had been greatly improved by the use of guano and rape dust in equal quantities. He was convinced that guano was a very superior manure, and as no farmer could produce more manure on his own premises than enough, and as none could ever have too much, he would recommend, if guano was worth the money asked for it, that they should use it without hesitation (applause).

Sir **John Johnstone**, M.P., Bart., said on looking over his estate last year, and consulting with several farmers, he had not been able to ascertain whether there was any material difference in the after crop subsequent to the use of guano, bones dissolved in sulphuric acid, or farm-yard manure, but he certainly was of opinion that guano was less beneficial than any other kind of manure. He admitted that it was wisdom to husband well the manure produced on any farm, but there were lands where artificial manure was wanted for the top dressings in the spring, and any gentleman living like himself in a hi ly country would feel the necessity of looking out for a portable manure. On the wolds of Yorkshire and his (Sir J. Johnstone's) own situation, the conveyance of farm-yard manure was difficult, and therefore guano, independent of its fertilizing qualities, was a very valuable article to the farmer (applause).

Professor **Johnston** wished it not to be understood that he had said anything with a view to undervalue farm-yard manure. He hoped the object of all farmers was to make money, and in Scotland he had discovered that those who applied the most manure to their land were realizing the largest gains (applause).

The noble **Chairman** then concluded the proceedings by calling upon the assembly to accord a vote of thanks to Professor Johnston, for his excellent and useful lecture, which was agreed to with acclamation.

THE COUNCIL DINNER.

The Council of the Society met at one o'clock on Wednesday, for the transaction of ordinary business, and at three dined together in the Music Saloon, Wood-street. Lord Wenlock presided, and the party present consisted principally of those who had attended the breakfast in the morning. After the dinner, no toasts were drunk except "The Health of the Queen," which was received with much enthusiasm, but it was arranged that a lecture should be delivered to the members of the Society upon an important agricultural subject, by Professor Johnston.

Before the company retired from the dinner table, the noble chairman requested Mr. Ledgard to read the judges' award of

PRIZES FOR IMPLEMENTS.

For the best planting and dibbling machine for corn alone, invented by Mr. Wotherstone, £5 to Messrs. Barrett, Exall, and Andrewes, Reading.

For the best new potato steamer and boiler, a silver medal to Mr. James Richmond, Salford, Manchester.

For the best corn and bean crusher, £3 to Mr. James Richmond, Salford, Manchester.

For the best potato washer, £3 to Mr. James Richmond, Salford.

For the best turnip and guano drill, invented by Mr. George Brown, £3 to Mr. J. Richmond, Salford.

For the best straw-cutter, £3 to Mr. J. Richmond, Salford.

For an improved horse-hoe, £3 to Mr. N. Busby, Newton-le-Willows, Bedale.

For a patent hay-maker, improved in the ready adaptation to inequalities of surface, £5 to Messrs. H. Smith and Co., Stamford.

For Marlin's patent oscillating horse-hoe or cultivator, £3 to Mr. Crosskill, Beverley.

For the best linseed crusher, invented by Mr. Dean, £3 to Messrs. Ryland and Dean, Birmingham.

For the best six-horse thrashing-machine, improved in speed and on hasses for holding oil, £7 to Messrs. R. and H. Grassby, Marton, Hull.

For the best planting and dibbling machine for corn and manure, a silver medal to Mr. W. H. Vingoe, Penzance, Cornwall.

For economic drain, tile, and pipe machine, makers R. Bradley and Co., inventors Mr. B. Denton, improved by a vertical cutter, £3 to Mr. J. H. Charnock, Wakefield.

For the best oil-cake crusher, £3 to Mr. J. H. Charnock, Wakefield. The judges especially commended this implement.

For the second best patent peg thrashing machine, invented by Mr. J. Atkinson, £5 to Mr. Joseph Thackrey, Doncaster.

For the best drill for general purposes, invented by Mr. Cartwright, £5 to Mr. T. Hunter, Ulceby, Barrow-on-Humber.

For the best dressing machine, a silver medal to Mr. S. Wheatley, Radcliffe-on-Trent, Nottingham.

For an improved horse-hoe, £3 to Mr. John Martin, Notton, Wakefield.

For the best assortment of implements in the yard, gold medal to Mr. Crosskill, Beverley.

The judges added to their report remarks to this effect—that they thought it unwise to give premiums year aftr year for implements in which there had been no improvement since the last exhibition, and they experienced considerable regret at the small amount of premiums which they felt they could with justice to the Society distribute in this department of the exhibition.

THE LECTURE.

After the Council Dinner the members of the society repaired to the Court House, when Lord Wenlock again took the chair, and Professor Johnston proceeded to deliver his lecture on the use of lime.

Professor **Johnston** commenced by observing that it was the object of every agricultural society, and more especially was it the object of their Council, in selecting the subject for that evening, to bring before them one of those instruments by which the greater fertility of the soil, all hoped and some believed, might be attained. He felt some difficulty in presuming to address them on that subject after the very excellent manner in which the subject had been treated at a meeting of the Wakefield Farmers' Club. He held in his hand a little pamphlet which he would take that opportunity of recommending to their notice, being the substance of a paper read before a meeting of the Wakefield Farmers' Club, by Mr. Henry Briggs. That little work contained a digest of all that had been written upon the subject, interspersed with many excellent observations of his own. He should have been very doubtful how far it would have been proper for him to treat upon that subject had he thought that meeting was merely one of the Wakefield Farmers' Club; but as it was a meeting of the Yorkshire Agricultural Society he thought he might refer to some of the things Mr. Briggs had brought forward, because he often found that personal addresses or familiar expositions had a greater effect on the mind than anything that was written (hear, hear). The application of lime to increase the productive powers of the soil was of great antiquity. Not only Athens, but also Rome might be mentioned; and with regard to Greece, nature had limed the land there to a very great extent. The learned lecturer then referred to the introduction of the use of lime into Scotland, by a Scotchman coming over to Norfolk, and adopting the application of lime to his land. Other good things followed; and by the application additional fertility was brought about. Since then Scotland had taken her high position in regard to agriculture. Previous to then, the pasture land in Scotland had produced but little, and very little beef and mutton was raised from them. Since the application of lime, they have raised more beef and mutton and corn than ever they had previously. Thus, the use of it in Norfolk was followed by its adoption in Scotland. He then mentioned that one crop he knew of had been increased three times in productiveness, almost entirely by the mere application of lime. The application in some districts had been found to produce a great deal of good. If they applied the lime in sufficient quantities, it would do good; but if afterwards they ceased to apply it, it would cease to do good. After the full effects had been produced, it would naturally produce no further good. If 30 years ago it produced no good, it did not follow that if they begun to apply it now, it would do us no good either. In Scotland, he believed, in various districts, the application of lime did no good. The lecturer here proceeded to explain, in a familiar manner, what chemists called carbonate of lime. Lime was generally found very pure; and the purer it was, the better was it for purposes in general. A certain kind of lime was very valuable for building purposes. Some kinds contained a great deal of sandy matter, and would not burn well. Another kind was magnesian lime stone, so called because it contained carbonic acid. That which contained a large quantity of lime, with a smaller quantity of magnesia, was, generally speaking, the best for agricultural purposes. If they took that limestone, burning would drive out the carbonic acid, and leave nothing behind but the lime. Three tons of limestone would leave about ten hundred and a quarter, and give out three hundred and three quarters of gas. If they took that limestone after it was burnt and put water into it, it would become very hot, so hot that gunpowder would ignite. He would place that on the land in that state. If they took that burnt lime and spread it over the land in the usual way, it would work up in the land. The land generally drank carbonic acid from the air, which always contained a certain amount. It would naturally be asked, why, if the lime brought carbonic acid, what is the use of burning? Why, because they could reduce it to a fine powder at a far cheaper rate, and therefore they had it at a much greater advantage. Besides the state of lime there was another state—the state of marl. That was applied to the soil of Norfolk. It was a mixture of clay —sometimes eight or ten per cent. When applied to the soil it, of course, produced certain effects. If applied to light sandy soil, it consolidated it. Its chemical, or, as he would term it, its agricultural effects were much greater. For example, much depended upon the kind of grass they grew. It sweetened the grass, and rendered the herbage more agreeable to the animal. Where bogs had before existed would spring up beautiful herbage of grass, and abundant crops of wheat, and increase also the quality of the soil. It would remove those effects on the health which undrained lands almost universally produced. It would render life more valuable and agreeable, which was a result every humane man ought and would take into consideration, in promoting individual benefit. The lecturer then referred to the quantity of lime which it was necessary should be applied to the land, year by year, in order to keep up the maximum state of fertility. The quantity he considered to be from eight to ten bushels per acre. It should be applied not year by year, but by rotation according to circumstances. A very interesting practical question here arose, namely, was lime necessary to all soils? He then drew attention to the uses of which geology was susceptible. [The Professor here referred to a geological map suspended on the wall]. The parts coe loured blue represented limestone-rocks. In those districts the application of lime was not required is such quantities as in other places. It was a curious fact also that the same district possessed numerous springs containing lime, which, if properly employed in irrigation, deposited the lime on the land. Thus geology answered the question, What soils most need the application of lime? Another tract of country, coloured blue on the map, was based on slate, which contained scarcely any lime. This county was chiefly moorland, and there was an evident natural want of lime. Another district was found to consist chiefly of trap rock. Trap contained a considerable portion of lime, for in four tons of whinstone there was as much lime as in one ton of limestone. It was a common practice near Haddington to dig up the pieces of whinstone, and use them on the surface. A question of great practical importance had been asked—Was lime indispensable to land in order to bring out all its fertility? His answer to this was, that lime is absolutely indispensable. There was a table of the composition of three soils, which had been submitted to him. One of them contained 59 parts in the 1,000; another contained 18 parts; and the other 4 parts. The first was found to be very fertile, the second ordinarily so, and the third barren. That which was most fertile had the greatest quantity of lime; and thus they found the results of experience confirming the deductions of analogy. If they took a portion of any plant, and analyzed it, they always found lime. Another proof was, that wherever lime was discontinued—unless it was derived from a natural source—the crops became sickly and unhealthy. They soon found "finger and toe," and other ill consequences. Such was the case in the Wolds of Yorkshire; and if they went to the Indies, they would there find that the plaintain would not grow without lime. He had soil sent over to him from the West Indies: he had recommended lime as a remedy, and the result had been as he expected, not only with the plaintain, but with the cane and other crops. It might be asked, What are the purposes of lime? A full answer to that question would include many chemical results which he could not then enter into; but it was certain that lime fed the plants, that they contained lime, and that they required lime. Lime, it was well known, had the effect of so changing the vegetable matters left in the earth, as to prepare and fit them for contributing to the feeding of the plant. Mr. Briggs, in the pamphlet before referred to, had drawn attention to some facts—not beyond all dispute, but which they must admit to be, at least, probable effects. If they burnt any vegetable matter—set a hay-stack on fire for instance—they would find for every ten tons of hay one ton of ash. That ash contained a certain portion of lime, of potash, sulphate of lime, &c. The rocks upon which the soil rested contained a quantity of those ingredients; and one effect of lime was to separate the soda and potash from the rocks, and mix them up with the soil. This was one of the effects supposed to follow from the application of lime. Certain soils contained acids: some contained the spirit of salt, or muriatic acid; and lime being placed on this acid, deprived it of its corrosive action. (The Professor explained this process by pouring acid upon lime in a tumbler: the liquid left after effervescence was corrosive, and would burn a hole in a coat; but by putting the lime upon the acid, it was found that the liquid was no longer corrosive, but might be poured upon cloth with impunity.) In peaty soils sulphuric acid was present: the addition of lime destroyed the effect of the acid, and the roots can then safely go down and avail themselves of the nutriment provided. The next question was, in what state to apply the lime, whether slaked or as lime compost. When the land was stiff, he would advise the application of slaked lime: when it was a light sandy soil, he recommended it to be put on in compost. Then, the quantity to be applied? When land was reclaimed for the first time, lime was applied in a large dose at first—in Scotland at the rate of 240 to 300 bushels to an acre. The effects were found gradually to increase, but the full effect was not seen till six or eight years; and it then gradually fell off towards the end of the lease; but after it had arrived at the highest state of fertility, to maintain it in that state required repeated doses year by year, rotation by rotation. Why was it necessary to repeat the lime? A portion was carried off by the rains. It sunk gradually beneath the reach of the spade or the plough. After a time, if they took up a spadeful of soil they would find a streak of lime; but after a further time, if they dug a spadeful they would find that the streak had disappeared: it had sunk into the earth, and was no longer of service. If they would fill their heads or their pockets they must continue to put in as well as take out: they would soon exhaust a purse of its gold or silver if they took all out and put nothing in. In a crop they took out ten different ingredients, and in lime they put in only one ingredient. It had passed into a proverb in all the countries in Europe, that "lime enriches the fathers and impoverishes the sons." The idea was prevalent that lime forced or persuaded the land, and it was not at all astonishing that if the fathers put large sums in their pockets there should be none left for the sons. But, if the farmer would only be as kind to the land as the land was to him—if he would only fulfil his promise to the land—there would be enough for both father and sons. In time, he believed they would come to this, that the farmer will be most anxious to supply as much as he takes out, and even to give more than he takes out of it: this, he believed, was the profitable farming that they should eventually come to. If they thought what he said or wrote was not profitable, they would be quite right in not following it. There was one other point to refer to, that was the fear of an over dose: he assured them he could direct them to property where the whole rental had been trebled in a few years; yet there were many who declare it was quite possible to add too much. In some parts of the country in Scotland, he knew land that had been reclaimed from the waste by the use of lime, and had produced ample crops for eight or nine years, and then refused even to grow oats. If they went on it and trod on it, it gave way and the foot sunk. But this was the result of applying lime and then robbing the land and impoverishing it by taking everything and giving nothing for years. Sir J. Macpherson Grant had sent him some of this soil which would not grow oats, and he found by analysis that it did not contain enough of lime. The loose state of the soil he had described was altogether a mechanical condition. It was a physical not a chemical state, and was to be overcome by physical means. The oat plant and clover required, as they knew, a stiff soil, and would not grow in the loose soil he had described. On land in the Carse of Gowrie, where at one period the clover grew to about three feet high, and a man would be almost hidden in the clover, now it would not grow at all. He had given his advice, and the first remedy was to solidify the land, and this was to be done by rolling with a machine something like Crosskill's clod-crusher, where the several prominences would drive down the soil. They must bear in mind that for lime to produce its full effects on organic and inorganic matter, it must be in contact with the air: it must not be buried, but be turned with a light harrow, and kept near the surface.

Professor Johnston having now concluded,

Lord Wenlock inquired whether any gentleman had any question to put.

A Gentleman wished to inquire whether the gas-lime used by many farmers was deteriorated by the use to which it had been put in the gas works.

Professor Johnston said that gas-lime was sought after eagerly by some persons, and rejected by others. In Paisley all was sold, that could be procured, at 1s. 6d. a load; at Edinburgh for only 6d. a load. It was really valuable, but not for immediate use. It would make an excellent compost if used at the end of twelve months. It was quite as valuable as other lime when used as a compost, and the more so because gas-lime contained a quantity of sulphur, and at the end of twelve months gypsum was formed, and they then got a mixture of lime and gypsum. They all knew the valuable properties of gypsum as a manure, but the gypsum did not exist in the gas-lime at first, it was by the chemical operation of the sulphur that it was formed at the end of the twelve months.

Mr. Shaw observed that the Professor had not said whether the other manures were to be added simultaneously with the lime, or at other times. This was a matter on which he and others would be glad to be informed.

Professor Johnston said this was an important question, to which he was happy to reply. When lime was applied in large doses, as a preparatory or preliminary to successive crops, it should be applied alone. They might apply it in the spring if they could not get it in the autumn, and employ the other manures in the ordinary way. As a rule, he thought it desirable to use other manures at a distance of two or three months from the lime.

A Gentleman here observed that the Professor had told them the cure of "fingers and toes," but he was desirous to know *how* lime cured that defect.

Professor Johnston said, it was a very easy thing to put questions, but not so easy to answer them. He was not prepared to say how the remedy operated. Some said the insect's presence was the cause, and that the application of lime destroyed the insect. Others said that the lime strengthened the turnips, and enabled them to resist the attack of the insect. He was aware of one fact that might throw some light on the subject: a farmer in Berwickshire had applied to some turnips lime in autumn, and to some lime in spring, and he found that those which had the lime in autumn were free from "fingers and toes," those which had it in spring were as bad as ever. He could not undertake to explain the operation of the cure; it was enough for him to know that lime did effect the cure.

H. S. Thompson, Esq., said he had some turnips affected with "finger and toe," which had been limed; he had a portion of them analyzed by a distinguished chemist, and the result was that the "finger and toe" turnips contained rather *more* lime than the others. His own opinion was that the lime if put on in spring was not a cure for that season, but would operate in the following one.

H. L. Maw, Esq., looked upon the "finger and toe" as a proof of poverty in the soil; the turnip appeared to be making an effort to feed itself, and pushed those roots for the purpose; those roots were spread out, and it fed and over fed itself.

There being no further question, Lord Wenlock proposed the thanks of the meeting to Professor Johnston, which was carried by acclamation.

Professor Johnston hoped they would allow him to make one observation in reply. He would assure them that the reception they had given him did not surprise him. It was the custom with some people to say that agriculturists were not fond of acquiring knowledge, but he had had the pleasure of addressing many audiences of practical farmers, from John o' Groat's as far south as Wakefield, had addressed them sometimes for two hours at a stretch, and they never exhibited impatience or weariness, but an anxious desire was expressed in their glistening eyes for further and further information. This was a very great encouragement to him in looking forward to the future prosperity of English agriculture. To the spread of knowledge alone they must look in their determination to grow more corn to feed more people, and put more money in their pocket (Great applause).

PRIZES FOR STOCK, &c.

JUDGES.

For Cattle.—Mr. Thos. Sowerby, Newton Morrell, Darlington; Mr. John Wright, Romley, Chesterfield; and Mr. W. Smith, West Rasen, Spittal. For Horses.—Mr. S. Harrison, Everton, Bawtry; Mr. Thomas Brookes, Croxby, Caistor; and Mr. John West, Melton Ross, near Brigg. For Sheep and Pigs.—Mr. W. Wetherell, Durham; Mr. Robt. Smith, Burley, Oakham; and Mr. S. Bennett, Bickareys, Woburn. For Poultry.—Mr. Fernandez, Wakefield. For Implements.—Mr. M. Harrison, Reyingham, near Headon; Mr. J. Almack, jun., Leckonfield, Beverley; Mr. W. Hislop, Woolley, Wakefield; and Mr. Peter Fairbairn, Leeds.

SHORT-HORNED CATTLE.

For the best bull of any age, 30*l.*, John M. Hopper, Newham, Stockton-on-Tees. Second do., 15*l.*, William Raine, jun., Morton, Tinmouth, Darlington.

For the best yearling bull, 15*l.*, John Booth, Killerby, Catterick. Second do., 15*l.*, Matthew Allan, Copmanthorpe, York.

For the best bull calf, 10*l.*, William Linton, Sheriff Hutton. Second do., 5*l.*, William Linton, Sheriff Hutton, York.

For the best cow of any age, in calf or milk, 20*l.*, John Booth, Killerby, Catterick. Second do., 10*l.*, Alexander Bannerman, South Cottage, Chorley.

For the best three-year-old cow, in calf or milk, and having had a calf, 15*l.*, Richard Booth, Warlaby, Northallerton. Second do., 5*l.*, William Thomas Carruthers, Arthington Hall, Otley.

For the best two-year-old heifer, in calf, 10*l.*, John Booth, Killerby, Catterick. Second do., 5*l.*, William Thomas Carruthers, Arthington Hall, Otley.

For the best yearling heifer, 10*l.*, William Thomas Carruthers, Arthington Hall, Otley. Second do., 5*l.*, G. D. Trotter, Bishop Middleham, Darlington.

For the best heifer calf, 10*l.*, Richard Booth, Warlaby, Northallerton. Second do., 5*l.*, Thomas Wetherell, Durham.

CATTLE OF ANY BREED.

For the best fat ox under four years of age, 10*l.*, R. Fleetwood Shaw, Brantingham, Hull.

For the best fat ox of any other age, 10*l.*, Earl of Carlisle, Castle Howard.

For the best fat cow or heifer of any age, 10*l.*, John Booth, Killerby, Catterick.

LONG-WOOLLED SHEEP.

For the best shearling ram, 20*l.*, Robert Dawson, Sewerby, Burlington. Second do., 10*l.*, George Robinson, Carnaby, Burlington.

For the best ram of any age, 15*l.*, George Robinson, Carnaby, Burlington. Second do., 5*l.*, George Robinson, Carnaby, Burlington.

For the best pen of five ewes, 10*l.*, W. E. Botterill, Easthorpe, Market-Weighton. Second do., 5*l.*, Robert Dawson, Sewerby, Burlington.

For the best pen of five shearling wethers, 10*l.*, George Simpson, Marton, Burlington. Second do., 5*l.*, John Holiday, Brampston, Beverley.

For the best pen of five shearling gimmers, 10*l.*, George Simpson, Marton, Burlington. Second do., 5*l.*, John Carter, Scales, Richmond.

PIGS.

For the best boar, large breed, 6*l.*, Richard Hobson, Park House, Leeds. Second do., 5*l.*, Henry Bentley, Oulton, Leeds.

For the best sow, large breed, in pig or milk, 6*l.*, William Cawson, Salford, Manchester. Second do., 3*l.*, Richard Almond, Orrell, Wigan.

For the best boar, small breed, 6*l.*, John Heaton, St. John's Cottage, Leeds. Second do., 3*l.*, William Cawson, Salford, Manchester.

For the best sow, small breed, in pig or milk, 6*l.*, John Hannam, North Deighton, Wetherby. Second do., 5*l.*, Richard Hobson, Park House, Leeds.

For the best three store pigs, of the same litter, from four to nine months old, 6*l.*, Wm. Guest, Worsbro', Barnsley. Second do., 3*l.*, William Micklethwaite, Keresforth, Barnsley.

For the best fat pig, 6*l.*, George Dunhill Moxon, Pontefract.

HORSES.

For the best stallion for hunters, 10*l.*, Richard Gaunt, Ingmanthorpe, Wetherby. Second ditto, 5*l.*, George Holmes, Thirsk.

For the best stallion for coach horses, 10*l.*, Thomas Hinchliffe, Barnsley. Second ditto, 5*l.*, Thomas Moss, Scargill, Greta-bridge.

For the best stallion for roadsters, 10*l.*, Thomas Cockshott, Addingham Moorside, Otley. Second ditto, Thomas Richardson, York.

For the best stallion for agricultural purposes, 10*l.*, Thomas Cockshott, Cringles, Skipton. Second ditto, 5*l.*, George Stones, Stubbs Walden, Pontefract.

For the best Cleveland bred stallion, 10*l.*, Henry Watson, Walkeringham, Bawtry. Second ditto, 5*l.*, Richard Waller, Welburn, Castle Howard.

For the best mare and foal for hunting, 5*l.*, Marmaduke Walker, Bossal, York. Second ditto, 2*l.*, William Sisson, Towton Tadcaster.

For the best mare and foal for coaching, 5*l.*, William Scholefield, Sand Hall, Howden. Second ditto, 2*l.*, Robert Brown, Hill Top, Wragby.

For the best roadster mare and foal, 5*l.*, Wm. Micklethwaite, Keresford, Barnsley. Second ditto, 2*l.*, John Smith, Hood Grange, Thirsk.

For the best mare and foal for draught, 5*l.*, Earl

Fitzwilliam, Wentworth, Rotherham. Second ditto, William Bennet Martin, Worsborough, Barnsley.

For the best Cleveland bred mare and foal, 5*l.*, Henry Watson, Walkeringham, Bawtry.

For the best three-year old hunting gelding or filly, 5*l.*, William Scriven, Aberford, Tadcaster. Second ditto 2*l.*, Timothy Smith, Hoyland Hall, Sheffield.

For the best three-year old coaching gelding or filly, 5*l.*, Thomas Denby, Rawcliffe, Selby. Second ditto, 2*l.*, Godfrey Wentworth, Woolley Park, Wakefield.

For the best two-year old coaching gelding or filly, 5*l.*, Joseph Grace Lund, Selby. Second ditto, 1*l.*, Joseph Watson, Coville House, Pately Bridge.

For the best three year old hackney gelding or filly, 5*l.*, Thomas Askwith, Greenwich, Pocklington. Second ditto, 2*l.*, John Richardson, Selby.

For the best pair of horses of either sex, for agricultural purposes, worked during the season, 5*l.*, Benjamin Shillito, Altofts, Wakefield. Second ditto, 2*l.*, Godfrey Wentworth, Woolley Park, Wakefield.

POULTRY.

For the best pair of fowls of the Dorking breed, male and female, 1*l.*, Godfrey Wentworth, Woolley Park, Wakefield.

For the best pair of fowls of the Spanish breed, male and female, 1*l.*, J. W. Nutt, York.

For the best pair of fowls of the Malay or Cochin China breed, male and female, 1*l.*, Thomas Jolly, Acomb Grange, York.

For the best pair of fowls of any breed or cross, 1*l.*, Alexander Thompson, Leeds.

For the best male fowl of any breed or cross, 2*l.*, Mrs. Milburn, Thorpfields, Thirsk.

For the best pair of young fowls of any breed, 1*l.*, Edward Smith, Bruntcliffe Lodge, Morley, Leeds.

For the best green goose, 1*l.*, Thomas Jolly, Acomb, York.

Eight of the Society's first and second prize silver medals were given for extra stock; two for each description of animals, viz., cattle, sheep, pigs, and horses.

White cow, John Booth, Killerby, Catterick.

First, T. C. Johnson, Chevet, Wakefield; 6 wethers, 2 shear; second, Robert Dawson, Sewerby, Burlington, 2 fat ewes.

First, a sow of the small breed, Richard Hobson, Park House, Leeds; second, two gilts of the same litter, John Heaton, St. John's Cottage, Leeds.

First, grey brood mare, William Firth, Kirkstall, Leeds; grey cart filly, Benjamin Shillito, Altofts, Wakefield.

First, J. W. Nutt, York, pair of silver spangled bantams; second, ditto, ditto.

CATALOGUE OF THE AGRICULTURAL IMPLEMENTS, &c. EXHIBITED AT THE NEWCASTLE MEETING OF THE ROYAL AGRICULTURAL SOCIETY.

Count Gripenberg, of Finland.

A corn drill (new implement), supplying the seed on an entirely new principle; invented by the exhibiter.

Mr. James Wilmot Newberry, of Hook Norton, near Chipping Norton, Oxfordshire.

A seven-rowed dibbling machine; invented by Saunder and Newberry, of Hook Norton. A one-rowed dibbling machine; invented by the exhibiter. A hand dibbling machine (new implement); invented by Saunder and Newberry; consists of 22 inch dibbling wheel, with 12 dibbles. A four-rowed dibbling machine; invented and improved by Saunder and Newberry.

Joseph Herbert, of Crosby, near Maryport, Cumberland.

A one-hore cart; improved and manufactured by the exhibiter. A plough, drawn by two horses, adapted to light land; improved and manufactured by the exhibiter.

Barrett and Ashton, of Hull, Yorkshire.

A clod crusher, or revolving, self-cleaning harrow (new implement); invented by John Naylor, of Goole, Yorkshire; improved by Mr. John Wells, farmer, of Armin, Yorkshire; and manufactured by the exhibiters. A press wheel roller and clod crusher; invented by William Cambridge, of Market Lavington, Wilts; and manufactured by the exhibiters. A combined scarifier and drag (new implement); invented by Charles J. Ashton, of Hull; improved by Henry J. Barrett, of Hull; and manufactured by the exhibiters. An iron expanding and contracting lever harrow (new implement), 12 feet wide; invented by Richard Coleman, of Colchester; improved and manufactured by the exhibiters. An iron expanding and contracting lever harrow (new implement), 6 feet wide; invented by Richard Coleman, of Colchester; improved and manufactured by the exhibiters. An expanding and contracting wrought-iron harrow (new implement), 9 feet wide; invented by Richard Coleman, of Colchester; improved and manufactured by the exhibiters. A set of wrought-iron harrows, 10 feet wide; invented by William Armstrong, of Hawnes, Beds.; improved and manufactured by the exhibiters. A set of wrought-iron harrows, 10 feet wide; invented by William Armstrong, of Hawnes, Beds; improved and manufactured by the exhibiters. An iron wheel plough (new implement), best adapted to strong land; invented and manufactured by the exhibiters. An iron swing plough (new implement), best adapted to strong land; invented and manufactured by the exhibiters. An iron two-wheel plough (new implement), best adapted to light land; invented by the exhibiters; improved by Mr. William Torr, of Riby, Lincolnshire; and manufactured by the exhibiters. An iron swing plough (new implement), best adapted to light land; invented by the exhibiter, improved by William Torr, of Riby, Lincolnshire, and manufactured by the exhibiters. A swing plough (new implement), best adapted to strong clay and wharp land; invented by the exhibiters; improved by Mansfield Harrison, of Keyingham Marsh; and manufactured by the exhibiters. An iron subsoil plough (new implement), best adapted to strong land; invented, improved, and manufactured by the exhibiters. An iron sub-soil pulverizer (new implement), best adapted to light land; invented by the exhibiters; improved by Mr. William Torr, of Riby, Lincolnshire; and manufactured by the exhibiters. An iron horse hoe (new implement); invented by the exhibiters; improved by Thomas Dickson, of Thorsway; and manufactured by the exhibiters. An iron one-way or turn-wrest plough;

invented by Mr. Lowcock, of Marldon; and manufactured by J. R. and A. Ransome, of Ipswich.

Richard Coleman, of Colchester.

A patent expanding lever harrow (new implement); invented and manufactured by the exhibiter. A patent expanding lever harrow (new implement); invented and manufactured by the exhibiter. A patent expanding harrow (new implement); invented and manufactured by the exhibiter. A patent subsoil harrow (new implement); invented and manufactured by the exhibiter. A patent subsoil harrow (new implement); invented and manufactured by the exhibiter. A patent subsoil harrow (new implement); invented and manufactured by the exhibiter. A patent subsoil harrow (new implement); invented and manufactured by the exhibiter.

Messrs. Charles Phillips and Co., of Bristol.

A turnip-cutter; invented by Charles Phillips, of Bristol; improved and manufactured by the exhibiters. A turnip-cutter; invented by Charles Phillips, of Bristol; improved and manufactured by the exhibiters.

John B. Rotherham, of Whiston, near Rotherham, Yorkshire.

A thrashing machine (new implement); invented and manufactured by the exhibiter.

Thomas Carss, of Guyzance, near Felton, Northumberland.

A plough; invented, improved, and manufactured by the exhibiter.

Egerton W. Harding, of Oldsprings, near Market Drayton.

A set of whippletrees (new implement); invented, improved, and manufactured by the exhibiter. A pair-horse subsoil pulverizer; invented, improved, and manufactured by the exhibiter. A pair-horse scarifier; invented, improved, and manufactured by the exhibiter. One-horse cart; invented, improved, and manufactured by the exhibiter.

Musgrave and Sawney, of Beverley, Yorkshire.

A winnowing machine; improved and manufactured by the exhibiters.

Mr. Nicholas Burnett, of Black Hedley, near Shotley Bridge, Northumberland.

A chaff or straw cutter (new implement); invented by the exhibiter; improved and manufactured by Burnett, Brothers, of Spring Gardens, Newcastle. A plough-drill (new implement), for sowing turnips with bones or other manures; invented by the exhibiter, and manufactured by George Emerson, of Greenhead, near Shotley Bridge. A portable ewe house; invented by the exhibiter, and manufactured by William Richardson, of Greenhead, near Shotley Bridge.

Jas. Anthony Emslie, Lambeth Terrace, London.

A machin e for making draining tiles or pipes for agricultural purposes; invented by the exhibiter; and manufactured by John Parker, Dean-street, Commercial-road East, London. A spring halter rope; invented by the exhibiter; and manufactured by John Parker, Dean-street, Commercial-road East.

Mr. Thomas Scragg, of Calvely, near Tarporley, Chester.

A machine for making draining tiles and pipes for agricultural purposes; invented and improved by the exhibiter, and manufactured by James Hewitt, of Calvely. A machine for making draining tiles and pipes for agricultural purposes; invented and improved by the exhibiter; and manufactured by James Hewitt, of Calvely.

Mr. Daniel Teago, of Marcham, near Abingdon, Berks.

A new 11-coulter drill for general purposes (new implement); invented, improved, and manufactured by the exhibiter.

Dalrymple Crawford, of Moseley-road, Birmingham.

A patent hand seed dibble (new implement); invented, improved, and manufactured by the exhibiter. A patent hand seed dibble (new implement); invented, improved, and manufactured by the exhibiter. A patent hand seed dibble (new implement); invented, improved, and manufactured by the exhibiter. Works on wheels.

Mr. Thomas Bigg, Crawford-street, Portman-square, London.

A sheep-dipping apparatus; invented and improved by the exhibiter, and manufactured by Charles Smart, of 369, Oxford-street, London.

Mr. George Cornes, of Wettenhall, near Winsford, Chester.

A plough (new implement); invented and manufactured by the exhibiter.

Mr. William Crosskill, of the Beverley Iron Works, Beverley, Yorkshire.

A patent clod-crusher roller; invented, improved, and manufactured by the exhibiter. A patent roller; invented, improved, and manufactured by the exhibiter. A pair of patent wheels and axle, manufactured by patent machinery; invented, improved, and manufactured by the exhibiter. An improved one-horse cart; improved and manufactured by the exhibiter. A one-horse cart; improved by Mr. William Torr, of Riby, and manufactured by the exhibiter. A two-horse cart; improved by Mr. William Torr, of Riby, and manufactured by the exhibiter. A Cirencester one-horse cart or harvest cart; improved and manufactured by the exhibiter. A one-horse light cart, or harvest cart; improved and manufactured by the exhibiter. A "model" one-horse cart, or harvest cart; improved and manufactured by the exhibiter. A light one-horse cart, mounted on springs, with a portable cover as a market cart; improved and manufactured by the exhibiter. A one-horse spring cart; improved and manufactured by the exhibiter. A sporting or dog cart; invented, improved, and manufactured by John Oxley, of Beverley. A one-horse cart, with self-acting tail-board; improved and manufactured by the exhibiter. A one-horse cart, with self-acting tail-board and patent break; patent break invented by Mr. Thatcher; improved and manufactured by the exhibiter. An iron liquid manure cart, with watering apparatus; invented, improved, and manufactured by the exhibiter. A patent portable iron liquid manure pump, with hose, pipe, &c.; invented by Mr. Beare, of London; improved and manufactured by the exhibiter. A patent portable iron pump and stand (new implement); invented, improved, and manufactured by the exhibiter. An iron liquid manure cart, with watering apparatus; invented, improved, and manufactured by the exhibiter. A patent fixture iron pump, with twelve feet of iron pipe, and ball at the end; invented by Beare, of London; improved and manufactured by the exhibiter. A portable manure drill, for sowing broadcast soot, lime, salt, ashes, guano, &c.; invented, improved, and manufactured by the exhibiter. A Yorkshire Wold six-coulter drill, for corn and general purposes; improved and manufactured by the exhibiter. A Lincolnshire six-coulter drill, for corn and general purposes; invented, improved, and manufactured by Richard Hornsby, of Grantham. A patent oscillating horse-hoe, for turnips, &c.; invented by Benjamin Elvidge, of Leven; improved and manufactured by Stephen Marlin, jun., of Leven. A patent grass land cultivator; invented, improved, and manufactured by the exhibiter. A patent subsoil pulverizer; invented by John Read, of London, and manufactured by the exhibiter. A drag harrow, or Uley cultivator; invented by John Morton, of Whitfield; improved by Richard Clyburn, of Uley, and manufactured by the exhibiter. A potato washer; invented, improved, and manufactured by the exhibiter. A circular iron dog or sheep trough; invented, improved, and manufactured by the exhibiter. A circular iron pig trough; improved and manufactured by the exhibiter. A patent iron fixture pig trough; invented by Mr. William Torr, of Riby; improved and manufactured by the exhibiter. A one-horse power mill for oats, malt, &c.; invented, improved, and manufactured by Ransomes and May, of Ipswich. A set of horse-work for one-horse power; invented, improved and mannfactured by Ransomes and May, of Ipswich. A one-horse power mill for linseed; improved and manufactured by Ransomes and May, of Ipswich. A hand-power mill for beans; invented, improved, and manufactured by Ransomes and May, of Ipswich. A hand-power mill for oats, malt &c.; improved and manufactured by Ransomes and May, of Ipswich. A hand-power mill for crushing linseed; improved and manufactured by Ransomes and May, of Ipswich. A two-horse power five-knife straw cutter; improved and manufactured by the exhibiter. A two-horse portable thrashing machine; improved and manufactured by the exhibiter. A four-horse portable thrashing machine; improved and manufactured by the exhibiter. A four-horse portable patent peg thrashing machine; improved and manufactured by the exhibiter. A corn dressing machine; improved and manufactured by the exhibiter. A machine for weighing carts and cattle; invented, improved, and manufactured by John Craig, of Liverpool. A machine for weighing sheep, calves, pigs, and agricultural produce; invented, improved, and manufactured by John Craig, of Liverpool. A weighing machine for general purposes; invented, improved, and manufactured by John Craig, of Liverpool.

Mr. William Gillespy, of Dissington, near Heddon-on-the-Wall, Northumberland.

A swing plough for heavy land (new implement); invented by George Tweddell, of Wylam, and manufactured by the exhibiter. A swing plough for light land (new implement); invented by George Tweddell, of Wylam, and manufactured by the exhibiter.

R. Gray and Sons, of Uddington, near Glasgow, Lanark, N.B.

An improved two-horse iron swing plough for light lands; invented and manufactured by the exhibiters. An improved two-horse iron swing plough for heavy lands; improved and manufactured by the exhibiters. An improved deep soil or trenching plough, with spare mountings for draining; improved aud manufactured by the exhibiters. A parallel lever subsoil pulverizer; invented and manufactured by the exhibiters. A parallel drill pulverizer; invented and manufactured by the exhibiters. A parallel horse-hoe, convertible into drill grubber; invented and manufactured by the exhibiter. An improved two-horse draught bars; improved and manufactured by the exhibiters. An improved three-horse equalizing draught bars; improved and manufactured by the exhibiters.

Mr. Edward Hammond Bentall, of Heybridge, near Maldon, Essex.

A patent hand seed depositor; invented and manufactured by the exhibiter. A pair of improved Essex wheat dibbers; manufactured by the exhibiter.

Mr. William Benson, of Allerwash Lime Works, near Haydon Bridge, Northumberland.

A patent machine for making drain-tiles, pipes, and other plastic substances; invented and manufactured by the exhibiter.

Nathaniel Dean and Sons, of Abingdon, Berkshire.

A newly invented iron field roll (new implement); invented by Mr. Roberts, of Waterbury, Oxon, improved and manufactured by the exhibiters.

John Henderson, of Peel Green, near Eccles, Lancashire.

A common plough, adapted for heavy land; invented by Mr. Gray, of Edingston; improved and manufactured by the exhibiter. A scarifier; invented by Mr. Findleson, of Moorkirk; improved and manufactured by the exhibiter. A chaff cutter (new implement); invented and manufactured by the exhibiter.

George Emerson, of Greenhead, near Shotley Bridge, Northumberland.

A common plough; improved and manufactured by the exhibiter. A ribbing plough; improved and manufactured by the exhibiter.

Phillips Fowler Hodgkins, of Chipping Norton, Oxfordshire.

A single-hand seed dibbler (new implement); invented and manufactured by the exhibiter. A double-hand seed dibbler (new implement); invented and manufactured by the exhibiter.

Mr. Wm. C. Cambridge, of Market Lavington, near Devizes, Wilts.

A patent 6 feet 6 inch single-shaft press, wheel roller or clod crusher, invented and manufactured by the exhibiter. A four-horse-power portable steam engine (new implement); invented and manufactured by the exhibiter. A bolting thrashing machine; improved and manufactured by the exhibiter. A patent four-horse portable thrashing machine; invented and manufactured by the exhibiter. A bolting thrashing machine; improved and manufactured by the exhibiter. A four-horse-power gear work (patent); invented and manufactured by the exhibiter. A two-horse-power portable thrashing machine (patent); invented and manufactured by the exhibiter. A chaff cutter, to be worked by hand, horse, or steam power; invented by John Cornes, of Barbridge; improved and manufactured by the exhibiter.

Mr. Richard Garrett, of Leiston Works, Saxmundham, Suffolk.

A stand of models of agricultural machinery; a drill for general purposes; a drill for turnips and mangold wurzel, with manure on the flat; a drill for turnips and mangold wurzel, with manure on the flat; a drill for turnips and mangold wurzel, with manure on the ridge; a three-row drill for turnips and mangold wurzel, with manure; an improved Kent drill (new implement); a twelve-row lever drill, for all kinds of grain and seeds; an eight-row lever drill; a nine-row lever drill; a ten-row lever drill; an eleven-row lever corn drill; a twelve-row lever corn drill; a fifteen-row lever corn drill; a patent horse hoe; a patent horse hoe; a four horse-power thrashing machine; a four horse-power bolting thrashing machine; a corn dressing machine; a dressing machine (new implement), invented by Mr. H. E. Blythe, of Burnham; a horse-power chaff cutter; a patent hand chaff cutter; a chaff cutter; a mill for grinding beans and peas; a horse-power mill for grinding beans and peas; a mill for oats, beans, and peas; a linseed mill; a patent inclined stone mill (new implement), invented by William Broughton, of London, working engineer; improved by Mr. A. O. Tanner, of New Basinghall-street, London; a rape and linseed cake crusher; a linseed cake crusher; a patent turnip cutter, invented by Charles Phillips, of Bristol; two patent subsoil pulverizers, invented by Mr. John Read, of London; a swing plough; a patent lever drag rake; a patent lever rake; a patent expanding lever harrow (new implement), invented by R. Coleman, of Colchester; a registered Norwegian harrow, improved by Richard Stratton, of Bristol; a patent drain pipe and tile machine, invented by Richard Weller, of Capel, near Dorking; an iron field roll; a patent clod crusher and cultivator; a patent wrought-iron corn rick stand, invented by the late J. Springall, of Ipswich. All these articles are invented or improved, and manufactured by Richard Garrett and Son, of Leiston Works.

Edward Pierce, of Llanasa, near Holywell, Flintshire.

A machine for spinning hay ropes; invented and manufactured by the exhibiter.

Thomas Teago, of Longworth, near Abingdon, Berks (late of Peasenhall, Suffolk).

A drill for general purposes; invented, improved, and manufactured by the exhibiter.

Richard Robinson, Lisburn, County Antrim.

A potato or root washer (new implement); improved and manufactured by the exhibiter. A churn, registered, and made of any size on this construction; invented by John Rowan and Sons; improved and manufactured by the exhibiter. A churn, with hot-water case; invented by John Rowan and Son, of Ballyclare; improved and manufactured by the exhibiter. A churn, with a new motive power as applied to it (new implement); improved and manufactured by the exhibiter. A milk ripener; invented and manufactured by the exhibiter. A set of tubs or coolers for dairy purposes; manufactured by the exhibiter. A portable steaming apparatus for roots, the boiler only (new implement); invented by J. Jennings, of New York; improved and manufactured by the exhibiter. A portable steaming apparatus and working model of an engine-boiler as above (new implement); invented by J. Jennings, of New York; improved and manufactured by the exhibiter. A set of draining tools, and other implements for farm use; invented and manufactured by John Gwynne, of Bustmills, county of Antrim. A cart axle, with models of same for railway and other purposes; invented by John Rowan and Sons, of Ballyclare; and manufactured by J. Rowan and Sons, now of Belfast.

Evan Thomas, of Meifod Village, near Welshpool, Montgomeryshire.

A scarifier or cultivator, with leverage to regulate the depth; invented, improved, and manufactured by the exhibiter.

William Bullock Webster, of Hounsdown, Southampton.

A patent hand pipe tile and brick machine (new implement); invented by the exhibiter; and manufactured by Tasker and Foule, the Waterloo Works, Andover. A machine for freeing clay from stones, roots, &c. (new implement); invented by the exhibiter; manufactured by Tasker and Foule, the Waterloo Works, Andover. A working model of the tile machine exhibited. A level for the purpose of draining, &c. (new implement); invented by the exhibiter; manufactured by G. Cox, Holborn Hill, London. A simple workman's level (new implement); invented by the exhibiter; and manufactured by G. Cox, Holborn Hill, London. Sets of draining tools, suited to various soils; improved by the exhibiter. A model of a set of iron machinery for drawing water; manufactured by Tasker and Foule, the Waterloo Iron Works, Andover. A model of a tile yard, after a plan of the exhibiter. Various tiles made by the machine exhibited, with a new tile for garden edging.

Mr. James Wilkie, of Woldingston, near Glasgow, Lanark, Scotland.

A plough, adapted to heavy land; a plough, adapted to light land; a scarifier or general cultivator; a subsoil pulverizer; a skim or paring plough; a hand seed dibble; all invented, improved, and manufactured by the exhibiter. A turnwrest plough; improved and manufactured by the exhibiter.

Mr. John Bruce, of Tiddington, near Stratford-on-Avon, Warwickshire.

A registered skim plough; invented, improved, and manufactured by the exhibiter. A patent subsoil plough; invented, improved, and manufactured by the exhibiter. A patent scarifier; invented, improved, and manufactured by the exhibiter. An expanding horse hoe (new implement); invented and manufactured by the exhibiter. A horse hoe (new implement); invented and manufactured by the exhibiter. A plough for heavy land (new implement): invented and manufactured by the exhibiter. A plough for light land (new implement); invented and manufactured by the exhibiter. A one-horse plough (new implement); invented and manufactured by the exhibiter. A ridging plough; invented and manufactured by the exhibiter. A plough for ridging for turnips, with drill and roller attached (new implement); invented and manufactured by the exhibiter. A patent sub-pulverizer plough: invented by Mr. John Read, of London; and manufactured, by licence, by the exhibiter. A patent balance lever horse rake; invented by Messrs. H. Smith and Co., of Stamford; and manufactured, by licence, by the exhibiter. A registered Norwegian harrow and clod crusher (new implement); improved by Messrs. Frere and Stratton, of Bristol; and manufactured, by licence, by the exhibiter. A package of the working parts of the above implements.

John Gillett, Wm. Colbourne, and Jas. Ward, of Stratford-on-Avon and Brailes, near Shipston-on-Stour, Warwickshire.

A small guillotine chaff engine; invented by James Ward, of Stratford-upon-Avon; and manufactured by John Gillett, of Brailes, near Shipston-on-Stour. An improved small patent guillotine chaff engine, with parallel motion; invented by James Ward, of Stratford-upon-Avon; improved and manufactured by John Gillett, of Brailes. An improved patent horse-power guillotine chaff engine; invented, improved, and manufactured by John Gillett, of Brailes. A patent turnip and vegetable grater and divider; invented by James Ward, of Stratford-upon-Avon; manufactured by the exhibiters. A registered hand seed depositor; invented by James Ward, of Stratford-upon-Avon; manufactured by the exhibiters. A patent rick ventilator; invented and manufactured by John Gillett, of Brailes. A self acting safety alarum gun; invented and manufactured by John Gillett, of Brailes.

Mr. Zachariah Parkes, of Birmingham.

A farmer's portable steel mill; invented and manufactured by the exhibiter. A farmer's double portable steel mill; invented and improved by the exhibiter. A farmer's mill; invented and manufactured by the exhibiter. An improved bean splitting mill upon iron frame; invented by Z. Parkes, sen., improved and manufactured by the exhibiter. A patent domestic flour mill; invented and manufactured by the exhibiter. A grocer's coffee mill; invented and manufactured by the exhibiter.

Thomas Roberts and Son, of St. Nicholas, Warwick.

A chaff cutter (new implement); invented and manufactured by the exhibiters. A chaff cutter (new implement); invented and manufactured by the exhibiters. A two-wheel plough, to work double or single for heavy land (new implement); invented and manufactured by the exhibiters. A skim or paring plough (new implement); invented and manufactured by the exhibiters.

Mr. Robert Roger, of Stockton-on-Tees, Durham.

A machine for manufacturing draining tiles and pipes (new implement); invented and improved by Mr. Thomas Lambert, of Stockton-on-Tees, and manufactured by the exhibiter.

Mr. James Spencer, of Hopton, near Wirksworth, Derbyshire.

A large chaff-cutter for one or two men, and for horse or engine power; a large chaff-cutter for one man or horse power, with pulley, &c., to connect with machinery; an oat and bean mill; all improved and manufactured by the exhibiter.

James Chadnor White, of Tewkesbury, Gloucestershire.

A set of gig harness, with patent shaft tugs, hame tugs, and crupper; invented and manufactured by the exhibiter.

Messrs. H. Smith and Co., of Stamford, Lincolnshire.

A patent chaff cutting engine, No. 1, 18-in. mouth, 1-knife; a patent iron horse-rake for corn, hay, twitch, stubble, &c.; a patent lever-wheel hand-rake; invented, improved, and manufactured by the exhibiters. An inproved double-acting haymaking machine; improved and manufactured by the exhibiters. A ridge drill for turnips, mangel wurzel, and other seeds with manure; invented, improved, and manufactured by the exhibiters. An improved land cultivator; invented and improved by S. Smith, of Northampton; and manufactured by the exhibiters.

Samuel Wheatley, of Radcliffe-upon-Trent, Nottinghamshire.

A winnowing machine; improved by Wm. Sandy, of Holme Pierrepont, and manufactured by the exhibiter. A rougher for barley and other grain when thrashed by machine; invented by Mr. Sandy, of Holme Pierrepont, and manufactured by the exhibiter.

William Henry Vingoe, of Penzance, Cornwall.

A patent seed-planting and manuring machine (new implement); invented, improved, and manufactured by the exhibiter.

W. and C. Young, of High-street, Edinburgh.

A strong wrought-iron field gate, with cast-iron posts; a strong wrought-iron gate, and cast-iron posts for railway purposes; models of four gates on the sympathetic principle, for railway purposes; a strong wrought-iron baluster park gate, with cast-iron posts; a handsome wrought-iron carriage gate, with cast-iron posts; invented, improved, and manufactured by the exhibiters. A strong wrought-iron sheep hay-rack with wheels; a strong wrought-iron hurdle for cattle and sheep; a strong wrought-iron hurdle for deer; a strong wrought-iron tree guard; a strong wrought-iron garden seat, improved and manufactured by the exhibiters. Ornamental iron and wire fences for dogs, sheep, &c.; ornamental iron and wire fence, for hares and rabbits; a strong wire netting for sheep; a strong wire net for poultry, pheasants, &c.; a strong wire net for hares and rabbits, invented, improved, and manufactured by the exhibiters. An improved steelyard for weighing grain, &c., &c.; an improved steelyard for weighing grain, &c.; improved and manufactured by the exhibiters. A wire plant guard against hares and rabbits; invented, improved, and manufactured by the exhibiters.

Robert Beart, of Godmanchester, Huntingdonshire.

A patent machine for making draining tiles, pipes, and soles; invented and improved by the exhibiter; and manufactured by the exhibiter and Joseph Evans, of Wolverhampton. A patent scarifier and clod crusher or pulverizer; invented and manufactured by the exhibiter.

Mr. Henry Clayton, of Upper Park-place, Dorset-square, London.

Various kinds of tools for cutting the drains for pipe tiles and other description of draining tiles; improved and manufactured by the exhibiter.

Mr. James Comins, of South Molton, Devonshire.

A subsoil pulverizer, with wood beam and iron handles (new implement); invented, improved, and manufactured by the exhibiter. A registered one-way plough, improved for hoeing or earthing-up potatoes, &c.; invented and improved by the exhibiter.

Mr. John Cornes, of Barbridge, near Nantwich, Chester.

A chaff-cutting machine, with three knives; a chaff-cutting machine with two knives; invented, improved, and manufactured by the exhibiter.

George Cubitt, of Walsham, Norfolk.

A linseed crusher (new implement); invented and manufactured by the exhibiter.

Mr. Samuel Harris, of Barker-street, Shrewsbury, Salop.

A barley pailer, or umbler; invented and manufactured by the exhibiter. A turnip drill on the ridge double; invented, improved, and manufactured by the exhibiter. A ridge plough, invented and manufactured by the exhibiter.

Barrett, Exall, and Andrews, of Reading.

A twenty-inch field roller; a sixteen-inch field roller, improved and manufactured by the exhibiters. An improved three-share subsoil plough; invented and manufactured by the exhibiters. A Reid's patent subpulverizer; invented by John Read, of London; manufactured by the exhibiters. A Reid's patent subpulverizer; invented by John Reid, of London; improved by the application of the patent hollow iron of Mr. Stratton, of Bristol; manufactured by the exhibiters. A universal plough; invented and manufactured by the exhibiters. A one-wheel plough; invented, improved, and manufactured by the exhibiters. A 3 two-wheel swing or Northumberland plough; a swing plough; a regulator plough, No. 1 (new implement); invented and manufactured by the exhibiters. A two-horse power thrashing machine, with bevil gear-work; invented, improved, and manufactured by the exhibiters. A one-horse power thrashing machine, with worm-wheel and screw gear-work; invented and manufactured by the exhibiters. A hand-power thrashing machine; invented by Mr. William Exall, and manufactured by the exhibiters. Revolving guillotine chaff cutter, No. 2 (new implement); a revolving guillotine chaff cutter, No. 5 (new implement); a chaff-cutting machine, No. 2; a horse-power chaff engine; a malt, oat, and bean mill (new implement); invented and manufactured by the exhibiters. A portable forge (new implement); invented and manufactured by the exhibiters. A Weatherstone's patent dibbling machine (new implement); invented by John Weatherstone, of Islip, near Oxford; manufactured by the exhibiters. An improved horse-rake; invented and manufactured by the exhibiters. A two-wheel presser; manufactured by the exhibiters.

James Gardener, of Banbury, Oxon.

A patent turnip cutter and a patent chaff machine; invented and manufactured by the exhibiter.

A. W. Gower and Sons, of Hook, near Hartford Bridge, Hants, and Market Drayton, Salop.

A drill for general purposes, with thirteen rows; invented by the late Mr. James Smyth, of Peasenhall, Suffolk; improved by A. W. Gower, of Hook, Hartford Bridge, Hants; and manufactured by the exhibiters. A corn and seed drill; invented also by the late Mr. James Smyth, of Peasenhall, Suffolk; improved and manufactured by the exhibiters.

Mr. David Harkes, of Mere, near Knutsford, Chester.

A plough for light or heavy lands; improved and manufactured by the exhibiter. A parallel expanding horse hoe; a horse hoe; a churn; invented and manufactured by the exhibiter. A patent seed and manure plough (new implement); invented by Mr. G. Brown, of Capesthorne, and manufactured by the exhibiter. A pipe and tile making machine; invented and manufactured by the exhibiter.

Mr. Joseph Cook Grant, of Stamford.

A Grant's patent lever horse rake, a Grant's patent lever pony rake, and a Grant's patent lever hand rake; invented, improved, and manufactured by the exhibiter. A hay-making machine; manufactured by the exhibiter. A Grant's improved hay-making machine (new implement); improved and manufactured by the exhibiter. A Grant's patent lever steerage horse hoe, and a pair of Grant's patent lever self-cleaning harrows; invented, improved, and manufactured by the exhibiter. A hand thrashing machine; improved and manufactured by the exhibiter. An improved weighing machine (new implement); invented and manufactured by the exhibiter. A small weighing machine; improved and manufactured by the exhibiter. A Grant's horse hoe and moulding plough, and an expanding turnip horse hoe; invented, improved, and manufactured by the exhibiter. A Grant's turnip, mangold-wurtzel, and manure drill; improved and manufactured by the exhibiter. A Grant's improved seed and garden drill; a Grant's garden, seed, and manure drill; a Grant's "G.S." plough; a Grant's "L.P." plough; a "G.O." plough (new implement); a Grant's newly invented turnip cutter (new implement); invented, improved, and manufactured by the exhibiter. A Grant's cake mill, and a Grant's mill for grinding beans or crushing oats; improved and manufactured by the exhibiter. A Grant's bean mill on wooden stand, and a Grant's bean mill on iron stand; invented, improved, and manufactured by the exhibiter. A set of Grant's whippletrees; improved and manufactured by the exhibiter. A set of Grant's wrought iron tube whippletrees, for ploughs, harrows, &c. (new implement); invented, improved, and manufactured by the exhibiter. A seven-tine Uley cultivator; improved and manufactured by the exhibiter. A registered dibbling flask (new implement); invented by Mr. John Edgson, of Elton, Northamptonshire; and manufactured by the exhibiter.

Jabez Hare, of Nelson-square, Blackfriar's Road, London.

A patent brick machine (new implement); invented by Alfred Hall, of Coxackie, and manufactured by Fred. Ransome, of Ipswich.

Mr. Edward Hill, of Brierley Hill Iron Works, near Dudley, Worcestershire.

An iron skim; an iron granary or store-room, crane, and winch; a wrought iron sheep fold hurdle; a wrought iron barrow for garden or stable purposes; a wrought-iron barrow, with apparatus for heating gas tar, &c.; a wrought-iron tree guard; a wrought-iron farmer's field gate and posts; a wrought-iron field gate; a wrought-iron sheep hurdle; a wrought-iron cattle hurdle; a wrought-iron ox hurdle; a length of a new description of continuous sheep fencing; a rabbit-proof iron hurdle; invented and manufactured by the exhibiter. Specimens of naptha black varnish; manufactured by the exhibiter.

Thomas Hunter, of Ulceby, near Barrow-upon-Humber, Lincoln.

A drill for general purposes, with ten coulters for corn and five for turnips; invented by Mr. Cartwright, of Fordington; improved and manufactured by the exhibiter. A drill for drilling grass seeds, with twenty spouts; invented, improved, and manufactured by the exhibiter. A ridge drill for two rows; invented by Mr. Cartwright, of Fordington, improved and manufactured by the exhibiter. An iron drag harrow, with twelve teeth; invented and manufactured by the exhibiter.

George Liddell, jun., of Sherburn Tile Sheds, Durham.

A machine for making drain tiles, pipes, and soles; invented and improved by the exhibiter, and manufactured by James Lumsden, of Durham.

Mr. Richard Hornsby, of Spittlegate, Grantham, Lincolnshire.

A one row ridge drill; a turnip seed and manure drill, for two rows upon ridges, and three rows on the flat; a one row drop ridge drill; a six row drill for turnips and manure; a ten coulter corn and seed drill; a drill machine for corn and general purposes; an improved corn dressing machine; a two row drill presser; a cake crusher, with two sets of cutters; a cake crusher on an improved principle; invented, improved, and manufactured by the exhibiter.

Mr. William Johnson, of Prudhoe, near Gateshead-on-Tyne, Northumberland.

A subsoil pulverizer (new implement); a surface soil pulverizer (new implement); invented by Mr. Anthony Hall, of Prudhoe, and manufactured by Mr. James Stokoe, of Newton, near Hexham.

James Kirkwood, of Farrent Foundry, Farrent, East Lothian.

A swing plough for heavy land, and a swing plough for light land; invented, improved, and manufactured by the exhibiter. A grubber or scarifier; a green crop cultivator; a subsoil pulverizer; invented and manufactured by the exhibiter.

Charles Lampitt, of Banbury, Oxfordshire.

A horse seed dibbler; improved and manufactured by the exhibiter. A hand seed dibbler; invented by John Lampitt, of Banbury, and manufactured by the exhibiter.

William and Thomas Reay, of Ponteland, New-castle-upon-Tyne.

A drill plough, with scufflers and harrow attached (new implement); invented and manufactured by the exhibiters.

Mr. Abraham Vickers, of Manchester.

A chaff cutter; a corn crusher; a corn and linseed crusher; and a cheese press; invented, improved, and manufactured by the exhibiter. A patent churn (new implement); invented by John Rowan, of Ballyclare, and manufactured by the exhibiter. An improved churn, and an improved churning apparatus; improved and manufactured by the exhibiter. A wheat mill; invented, improved, and manufactured by the exhibiter. A hand seed dibble (new implement); invented by Mr. Dingle, Cornwall. A hand seed dibble (new implement); invented by Mr. Crawford, of Birmingham. A patent fire or garden engine (new implement); invented by Mr. Glasgow, of Birmingham. An oilcake breaker; invented and manufactured by the exhibiter.

John Henry Charnock, of Wakefield, Yorkshire.

A drain tile and pipe machine, entitled "the economic tile and pipe machine;" invented by John Bailey Denton, of Gray's Inn Square, London, and by the exhibiter; improved by them and by the manufacturers; and manufactured by Messrs. R. Bradley and Co., of Wakefield. The "A" level for draining, sewering, &c.; invented by J. Bailey Denton, of Gray's Inn Square, London, and manufactured by Messrs. Jones and Son, of Holborn, London. A specimen of porous drain pipes for the drainage of running sands (new implement); invented and manufactured by the exhibiter.

John Ainslie, of Alperton, near Acton, Middlesex.

A one-horse power tile-making machine (new implement); a one-hand-power tile-making machine (new implement); a model of a new patent tile and brick kiln; a model of a patent drying house for drying tiles; invented by the exhibiter, and manufactured by George Howe, of Great Guildford-street, Surrey.

Messrs. Cottam and Hallen, of Winsley-street, Oxford-street, London.

A tile-making machine; invented by John Hatcher, of Benenden, Kent. An improved draining level; invented by Mr. S. Paine, of Llanelly House, Carmarthenshire. A set of draining spades and crane or swan's neck; improved and manufactured by the exhibiters. A digging fork, called the "pulverizer" (new implement); a pair of improved seed dibbles; invented by Mr. Richard Smith, of Upper Hall, Hampton Lovett, Worcestershire; manufactured by the exhibiters. A dynamometer or draught-guage; improved by George Cottam, of Winsley-street, Oxford-street; and manufactured by the exhibiters. A metallic churn; invented by Johnson, of London; and manufactured by the exhibiters. A cycloidal-toothed grubber; invented by G. Cottam, of Winsley-street; and manufactured by the exhibiters.

W. Grounsell, of Louth, Lincolnshire.

A new dressing machine (new implement); a newly improved clod crusher (new implement); a new dibbling machine (new implement); invented and manufactured by the exhibiter.

William Harper, of Beuler, Suffolk.

A chaff-cutter; improved and manufactured by the exhibiter. A one or two-horse power machinery (new implement); invented and manufactured by the exhibiter.

George Howe, of Great Guildford-street, Borough, London.

A portable horse mill, for working tile machines; manufactured by the exhibiter.

Mr. John Howard, of Bedford.

Patent iron ploughs with two wheels; a set of patent iron harrows; invented and manufactured by J. Howard and Co., of Bedford.

James and Co., of Fish-street Hill, London.

A 21 cwt. weighing machine, for weighing live cattle and farm produce generally; invented by Monsieur George, of Paris; improved and manufactured by the exhibiters. A portable machine for weighing loaded carts and waggons, and farm produce generally (new implement); a 20 cwt. machine, for weighing live cattle and farm produce generally (new implement); invented by William Clark, of London; improved and manufactured by the exhibiters. A 5 cwt. weighing machine, for weighing sheep, corn, &c.; a 3 cwt. machine for weighing sacks and sheep (new implement); a 3 cwt. machine for weighing sacks; invented and manufactured by the exhibiters. A 3 cwt. weighing machine, for weighing turnips, potatoes, corn, &c.; manufactured by the exhibiters. An improved fruit gatherer; invented and manufactured by James Lane, of London.

F. M'Neill and Co., Lamb's Buildings, Bunhill-row, London.

The patent asphalted felt, for roofing houses and every description of farm buildings; improved and manufactured by the exhibiters. A portable tar kettle; invented by J. F. Williams, of Lamb's Buildings, Bunhill row. Models illustrating the uses of the asphalted felt on various description of buildings; also showing the most economical construction of timbers to receive the felt and the best methods of applying it. A labourer's cottage, covered with the asphalted felt, and constructed with the view to the morality of its inmates; invented and manufactured by Mr. Peter Thompson, general builder, Commercial-road, Limehouse, London.

George Parsons, of West Lambrook, near South Petherton, Somerset.

A one-horse manure cart, with a harvest-frame (new implement); invented by the exhibiter; manufactured by John Noble, of West Lambrook. A linseed, corn, rape, and malt-crushing machine (new implement); a linseed, corn, rape, and malt-crushing machine; invented by the exhibiter and Richard Clyburn, of Uley, Gloucestershire; and manufactured by Richard Clyburnt. A set of four improved screw-spanners or wrenches; invented and manufactured by Richard Clyburn, of Uley, Gloucestershire.

Mr. Henry Putland, of Hurst-green, Sussex.

A box containing patent riding and driving reins and patent tugs; invented and manufactured by Putland and Wood, of Crown-street, Finsbury-square.

John Read, of Regent's Circus, Piccadilly, London.

A patent subsoil pulverizer, with wood beams and handles; invented and manufactured by the exhibiter. A subsoil pulverizer, with patent iron beam and handles; invented by the exhibiter; improved in the iron beam by Richard Stratton, of Bristol; and manufactured by the exhibiter. A scarifier; an improved skim, or paring plough; an improved niget for hop-gardens, also for coffee and sugar plantations; a patent single-action fire and garden-engine (new implement); a patent double-action fire-engine (new implement); an improved patent Kent or Sussex turn-wrist plough; a case, containing sundry small implements for the relief of hoven in choked cattle, &c.; invented and manufactured by the exhibiter.

Ransomes and May, of Ipswich, Suffolk.

A double trenching plough, and fittings on Ransomes and May's patent principle (new implement); invented and manufactured by the exhibiters. A land-draining plough, and fittings on Ransomes and May's patent principle (new implement); invented and manufactured by the exhibiter.

Thomas Richards, of Taunton, Somersetshire.

A patent bellcrank lever thrashing machine; invented by Lieut. Vibart, R.N., of Chilliswood, and manufactured by the exhibiter. A mitre-knife turnip-cutter (new implement); improved and manufactured by the exhibiter. A chaff cutter (new implement); invented by Lieut. Vibart, R.N., of Chilliswood, and manufactured by the exhibiter.

Mr. James Richmond, of Salford, Manchester.

An improved steaming apparatus; a chaff engine; an improved chaff engine; an improved mill for kibbling beans, oats, &c.; an improved mill for bruising linseed; an improved machine for washing vegetables; an improved vertical dash churn; invented, improved, and manufactured by the exhibiter. A patent manure and seed plough (new implement); invented and improved by George Brown, of Capesthorne, Cheshire; and manufactured by the exhibiter.

Samuel Rigg, of Abbey House, near Wigl.

A scarifier; invented by J. Wilkie, of Uddingstone; improved by Joseph Rigg, of Abbey House; manufactured by Richard Scott, of Causeway-head. A set of iron harrows; invented by Joseph Mann, of Raby; improved by Joseph Rigg, of Abbey House; and manufactured by Richard Scott, of Causeway-head.

John Twist, of Bridge Town, Stratford-on-Avon, Warwick.

A registered skim or paring plough, with improvements; invented, improved, and manufactured by the exhibiter. A new iron plough (new implement); a wrought-iron scarifier or cultivator, with seven shares (new implement); a two-rowed hand seed dibbling machine; invented and manufactured by the exhibiter.

Mr. Edward Upfill, of Birmingham.

A newly improved sheep fold; a newly improved sheep hay rack; a cow crib; invented, improved, and manufactured by the exhibiter. A cow crib; tree guards; field gates; sheep and ox hurdles; hare and rabbit fencing; garden chairs; wrought-iron hay racks; invented and manufactured by the exhibiter. Cast-iron corn mangers; invented and manufactured by David Green, of Birmingham. Sack trucks; invented and manufactured by the exhibiter. Iron truck for wheeling sacks; manufactured by the exhibiter. Wrought-iron garden gates; invented and manufactured by the exhibiter. Pattern of carriage jacks; manufactured by the exhibiter. Wrought-iron palisading; invented and manufactured by the exhibiter. Pattern of palisading; trellis work; a flower stand; a wire hare-proof fencing; manufactured by the exhibiter.

William Arkley, of Broomby, near Bywell, Northumberland.

An iron plough, adapted for heavy, strong land; an iron plough, adapted for light land; invented, improved, and manufactured by the exhibiter.

Mr. James Smyth, of Peasenhall, near Yoxford, Suffolk.

A nine-coulter corn drill; a corn drill for eight or ten furrow lands, for fifteen rows; a general-purpose drill for ten rows; invented, improved, and manufactured by the exhibiter. A turnip and mangold wurzel roll-ridge drill; invented and manufactured by the exhibiter.

Mr. Edward Brayton, of Burgh-by-Sands, near Carlisle, Cumberland.

A two-horse swing plough, adapted for heavy land; invented, improved, and manufactured by the exhibiter. A two-horse swing plough, adapted for light soils; invented by the exhibiter. A two-horse scarifier or grubber; invented and manufactured by John Brayton, of Kirkandrews-upon-Eden. A one-horse couch gatherer, for gathering up couch after the scarifier; invented and manufactured by the exhibiter.

Dr. John William Calvert, of Blandford-place, Regent's Park, London.

A patent hand machine for the manufacture of pantiles; invented by the exhibiter; manufactured by Henry Clayton, of Upper Park-place, Dorset-square. A patent hand machine for stirring clay; invented by Beart; manufactured by Henry Clayton, of Upper Park-place, Dorset-square.

Mrs. Mary Cartmell, of London Road, Liverpool.

A four knife machine for cutting hay and straw, &c.; invented by Mr. Thomas Pasmore, of Doncaster; improved by Mr. William Cartmell, of Liverpool; and manufactured by the exhibiter. A mill for crushing oats, beans, barley, Indian corn, &c.; invented by Thomas Cartmell, of Doncaster; improved and manufactured by the exhibiter. A double turnip cutter, for sheep and cattle; an oilcake crusher; invented, improved, and manufactured by the exhibiter.

Matthew Gibson, of Wellington-street, Newcastle-upon-Tyne, Northumberland.

A reaping machine (new implement); invented, improved, and manufactured by the exhibiter.

Mr. Merryweather, of Long-acre, London.

A fire engine; invented by Hadley and Simpkin, Long-acre; improved and manufactured by the exhibiter. A fire engine; invented and manufactured by the exhibiter.

Mr. William Wood, of Knutsford, Chester.

A single iron plough, for light or heavy land; a horse hoe; a turnip cutter (new implement); a cultivator, with five or nine tines; a double plough for ridging; a churn; invented and manufactured by the exhibiter.

John Teasdale, of Burneston, near Bedale, Yorkshire.

A turnip drill (new implement); invented, improved, and manufactured by the exhibiter.

Mr. Richard Stratton, of Bristol.

A single horse skeleton harvest cart; invented by Mr. J. Hannam, of Burcott, Oxon; improved and manufactured by the exhibiter. A light single horse agricultural cart; a single horse farm cart; a cranked axle tipping manure cart, with liquid manure body to fit; a single horse liquid-manure and water cart; a portable iron manure pump and stand; a model of a farm waggon; invented, improved, and manufactured by the exhibiter. A model of a straight raved waggon; a model of a meal waggon; a model of a meal cart; a model of a stone cart; a model of a Gloucestershire cart; a model of a farm cart with bent shafts; a model of a cranked axle tipping manure cart; a model of a cranked axle manure cart, with the water tank fixed on; a model of a liquid manure pump; a model of a family cart, or Coburg; manufactured by the exhibiter. A model of Stratton's patent hollow iron, as used in plough beams. A Read's patent subpulverizer, with Stratton's patent hollow iron beam; invented by Mr. John Read, of London; improved and manufactured by the exhibiter. A pair of patent hollow iron wheels; invented, improved, and manufactured by the exhibiter. A registered Norwegian harrow and clod crusher (new implement); improved by Mr. George E. Frere, F.R.S., of Royden Hall, Norfolk, and by the exhibiter; manufactured by the exhibiter. An original Norwegian harrow and clodcrusher; invented in Norway, manufactured by the exhibiter. A registered wrought-iron scarifier (new implement); invented by Mr. G. E. Frere and the exhibiter, manufactured by the exhibiter. A linseed crusher, an oat crusher, and a bean crusher; invented, improved, and manufactured by the exhibiter. A stone breaker, registered; invented by Mr. Robert Fry, of Tockington; improved and manufactured by the exhibiter. A gorse crusher, registered; invented and manufactured by Mr. Robert Fry, of Tockington. Stratton's registered tipping waggon; invented, improved, and manufactured by the exhibiter.

Mr. Andrew Ford, of Shortby Bridge, near Newcastle-on-Tyne, Durham.

A two horse iron plough for strong land; invented by Mr. Cunningham, of Slateford, Edinburgh; improved and manufactured by the exhibiter.

Thomas Brayton, of Stockdalworth, near Carlisle, Cumberland.

A plough (new implement); invented and manufactured by the exhibiter.

Thomas Gibbs and Co., the seedsmen to the Royal Agricultural Society of England, and to the Boards of Agriculture of England and Sweden; corner of Half Moon-street, Piccadilly, London.

Grass Seeds.—Agrostis stolonifera, agrostis capillaris, agrostis alba, agrostis spica venti, aira canescens, aira cœspitosa, lutescens, aira flexuosa, alopecurus agrestis, alopecurus nigricans, alopecurus geniculatus, alopecurus pratensis, arundo arenaria, anthoxanthum odoratum, bromus pratensis, bromus arvensis, bromus mollis, bromus distachyos, bromus pennatus, bromus rubens, briza media, cynosurus cristatus, dactylis glomerata, festuca fluitans, festuca tenuifolia, festuca ovina, festuca heterophylla, festuca elatior, festuca sylvatica, festuca rubra, festuca loliacea, holcus avenaceus, lolium multiflorum, lolium multiflorum submutica, lolium Bretagne, lolium arvense, lolium temulentum, lolium parenne var, lolium Italicum, mellium effusum, melica ciliata, melica altissima, molina cœrulea, panicum germanicum, panicum meliaceum rubrum, panicum Italicum, panicum meliaceum glaucum, panicum meliaceum album, panicum meliaceum nigrum, poa aquatica, poa distans, poa compressa, poa flexuosa, poa annua, poa nemoralis, poa nervata, poa fertilis, poa pratensis, poa trivialis, madia sativa, bunias orientalis, lotus corniculatus major, lotus corniculatus minor, ervum monanthos, and melelotus officinalis. Specimens of the plant and seed of the Tussac grass from the Falkland Islands.

Turnips.—Gibbs's fine purple-top Swedish turnip, combining small top and beauty of form. Gibbs's fine green-top Swedish turnip. Gibbs's large green-top yellow hybrid turnip: a useful turnip to sow after Swedes. Gibbs's large red-top yellow hybrid turnip: a useful turnip to sow after Swedes. Green globe turnip; white ditto ditto; green tankard ditto; white ditto ditto; red ditto ditto; early stubble ditto.

Mangold-wurzels.—Long red mangold-wurzel, producing heavy crops; yellow globe ditto, highly approved for shallow ends; red globe ditto, highly approved for shallow ends, long yellow ditto.

Carrots.—Large white Flemish carrot, producing extraordinary crops; large Belgium ditto; Altringham ditto; early horn ditto; long orange ditto.

Wheats.—Flanders wheat, Hunter's ditto, Belle-Vue Talavera ditto, white Hungarian ditto, Hickling's ditto, Tonselle ditto, Fellemburgh ditto, Picton ditto, Paris winter ditto, Cressy ditto, common March ditto, Saumur ditto, Chili ditto, Tunstall ditto, Odessa ditto, Indian ditto, Chinese ditto, Naples white Richell ditto, Whittington ditto, Grant's ditto, Massalarge ditto, Marianople ditto, red March ditto, golden drop ditto, early striped chaff ditto, Lammas ditto, red Mancha ditto, blood-red ditto, red Provence Tonsell ditto, red Caucassian ditto, Sicilian ditto, and Cretan ditto.

Miscellaneous.—Sainfoin, red clover, white ditto, trefoil, chicory, burnet, spurry, rib grass, astragalus bœticus, trifolium hybridum or alsike, trifolium medium, trifolium repens, medicago sativa, achellea melifolium, trifolium filliformis, Gibbs's large drumhead cattle cabbage, large green kohl rabi, large purple kohl rabi, and rape or cole-seed. A collection of field and kitchen peas and beans. A general assortment of agricultural seeds. Dried specimens of clover, beans, peas, 70 kinds of wheat, 16 ditto of barley, 16 ditto of oats, 3 ditto of rye, 254 ditto of natural grasses, &c.

Stephen Bencraft, of Barstaple, Devon.

A patent saddle; invented by the exhibiter, and manufactured by Cookman and Windmill, George-street, Portman-square, London. A set of patent hames; invented by the exhibiter, and manufactured by Bruce and Box, of Walsall, Staffordshire.

George Gibbs and Co., Seedsmen, &c., to the Royal Agricultural Department of Belgium, and Corresponding Member and Seedsmen to the Agricultural Society of Zealand, in the Netherlands, Down-street, Piccadilly, near Hyde-park Corner.

Meadow and pasture grass seeds, samples of the mixtures they are made up for the various soils, &c., the price is 32s. per acre, allowing 2 bushs. and 12lbs. to each acre. Samples of the mixture for renovating old grass land, 1s. 3d. per lb. Samples of the seeds of the most approved natural grasses. Specimens of the various grasses dried. Italian rye-grass, tall variety, true, 8s. 6d. per bush. Italian rye-grass, dwarf brown, Mr. Rodwell's. Evergreen perennial rye-grass, 7s. 6d. per bush. Stickney's perennial rye-grass, 7s. 6d. per bush. Festuca loliacea. Alsike hybrid clover; this is a valuable plant, both for hay and feeding; it is found in the rich meadows of Sweden: price 2s. 6d. per lb. South American clover (Medicago Maculata). Bokhara clover. Dwarf perennial red clover, of the meadows, 1s. 2d. per lb, Flemish white clover. English white clover (trifolium minus). Trifolium incarnatum. English and French samples of red clover. Tussac grass seed and plant, a native of the Falkland Islands. Spurry, used in Flanders, for autumn feeding on stubble; 1s. per lb. Chicory, for sheep feeding; the root used as coffee. Burnett, very useful in mixtures for sheep feeding on thin soils. Sainfoin, milled, the best way of sowing it. Sheep's parsley, now much in use, sown with clover, &c., for feeding. White mustard-seed. Camelina Sativa (oil plant), seed and cake, for feeding. Flax or linseed, English and foreign samples. Furze or gorse, the variety in use for feeding. Broom. Large cattle parsnip. Dwarf and tall rape, or cole seed. Thousand-headed cabbage; the seed should be sown early in March: the plant is very useful for ewes and lambs in severe writers. Kohl rabi, or Hungarian turnip: all stock relish this root; it is feeding, and is very hardy. It may be sown in March, and transplanted, like a cabbage plant, or it may be sown in drills, the end of April or beginning of May, and treated like a Swede. Seed, 2s. 6d. per lb. Carrot, large Belgian white, 1s. 6d. per lb.; pale yellow; large Altringham; large horn, or James's superb; long Surrey; long orange. Mangold wurtzel, long red, 9d. per lb.; long yellow, 1s. per lb.; long white, or sugar beet, 1s. per lb.; orange, or yellow globe, 1s. per lb.; red globe, 1s. per lb.; white globe, 1s. per lb.

Turnips.—Ashcroft's Swede was raised by Mr. Ashcroft, some few years ago; it has won several prizes in competition with other sorts; it is a heavy cropper, of nutritious yellow flesh; stores well, and will bear sowing later than most other Swedes: seed, 1s. per lb. Tankard Swede.—This is a pure Swede, in form something like the common tankard turnip; it is of good quality, and in some soils is grown to great advantage: seed, 1s. 6d. per lb. Nottinghamshire purple-top moss Swede.—Oblong in shape, yellow flesh of best quality; is a heavy cropper, and stores well: seed, 1s. 6d. per lb. Skirving's Swede.—This variety is well known: seed, 1s. per lb. Laing's Swede.—This is a very handsome root, of comparatively tender flesh; has a peculiar leaf, and is of early maturity as a Swede: seed, 1s. per lb. True purple-top Swede, G.G.—This was selected by George Gibbs and Co., from an excellent stock, and has given general satisfaction; they recommend it as deserving of notice: seed, 9d. per lb. Matson's purple-top Swede.—A very handsome root: seed, 1s. per lb. Pain's Kentish green crown Swede. —A hardy, nutritious root: seed, 1s. per lb. Oxford green crown Swede.—Very hardy; coarser in the skin than Pain's; yellow flesh, of best quality: seed, 9d. per lb. Hybrid green crown yellow, G.G.—An excellent variety to use before the Swedes: seed, 1s. per lb. Dale's hybrid yellow: seed, 1s. per lb. Imperial purple crown yellow border turnip, 1s. per lb.; green crown yellow Scotch bullock turnip, 1s. per lb.; yellow tankard 1s. per lb.; white, red, and green tankard turnip, 1s. per lb. each; white, red, and green globe, 9d. per lb. each.; early stone, 9d. per lb.

WHEATS.—Red chaff white, Russell white, Eley's gigantic, Australian white, Mr. Fisher Hobbs's red marygold, red burwell, Le Couteur's belle vue Talavera, Chidum white, chevalier white, Launceston white, a neat and heavy grain; red cluster. A collection of wheats in ear and straw.

Early Giant Tyrolese Rye.—This is recommended to be sown about midsummer for early use as green food.

BARLEY.—Potter's prolific, providence, Leghorn, winter, Egyptian thick-set, annat, skinless or barley wheat.

Oats in variety: Brank, or buck-wheat. Peas: nine-podded field, and others. Tares: Early racer winter; winter, common kind; large gourd spring; spring, common kind; white. Lupins, for field use; lentils, for field use.

John Little, of New Castleton, by Langholme, Roxburgh.

A plough adapted for heavy land, and answering different purposes, viz., trenching, paring, and heavy ploughing; manufactured by the exhibiter and B. Smith. A plough adapted for light land and common ploughing in general; manufactured by the exhibiter. A single horse cart, improved axle and wheels; improved by the exhibiter.

Mr. William Busby, of Newton-le-Willows, near Bedale, Yorkshire.

A seed furrow plough, two wheels; a swing plough; a set of undulating harrows; a strong horse rake; a light horse rake; a horse hoe; invented and manufactured by the exhibiter. A horse hoe, invented by S. Marling.

John Geddes, of Cargen Bridge, near Dumfries, Kirkcudbright.

A drill sowing machine, for all kinds of grain (new implement); a turnip sowing machine (new implement); invented, improved, and manufactured by the exhibiter.

Joseph Miller, of Barnetby-le-Wold, near Brigg, Lincolnshire.

An iron drag harrow; invented, improved, and manufactured by the exhibiter.

Thomas Taylor, of Banbury, Oxfordshire.

A patent inflated saddle; a hunting saddle, with patent moveable pannel; invented, improved, and manufactured by the exhibiter. Registered bits for riding and driving bridles; invented by the exhibiter, and manufactured by S. Hudson, of Birmingham.

Charles Miles, of Great Russell-street, London.

Model of an improved field gate; invented by the exhibiter.

Mr. George Bruce, of Liverpool.

A specimen of black japan varnish; a specimen of blue varnish; a specimen of red varnish; a specimen of green varnish; a sample of cheap and durable oil; invented and manufactured by the exhibiter.

Mr. Edward J. Lance, of Frimley, near Bagshot, Surrey.

A collection of agricultural soils; arranged geologically, from London to the primitive rocks of the west and north of Britain. A collection of manures, organic and inorganic, adapted to the various nature of soils. Luxuriant agricultural produce the effect of the adaptation of manure to the chemical and mineral nature of soils. The bane and the antidote of farming. Specimens of geological formations, sites of agricultural meetings of the Royal Agricultural Society. Specimens of diseased corn. Agricultural books of the exhibiter's own writing.

Waldie and Hunter, of Kelso, Roxburgh.

A set of harness for agricultural purposes; a riding or hunting saddle; improved and manufactured by the exhibiter.

SPEECH OF JOHN GREY, ESQ., AT THE PAVILION OF THE ROYAL ENGLISH AGRICULTURAL SOCIETY, IN NEWCASTLE, JULY 16, 1846.

[Many inaccuracies having occurred in Mr. Grey's speech, as reported in the proceedings of the Royal Agricultural Society, in the *Farmer's Magazine* for August, we insert the following as corrected.—ED. F. MAG.]

Mr. GREY, of Dilston, on rising to propose the toast entrusted to him, was received with loud cheering. When this had subsided, he said—Notwithstanding the very kind encouragement which certain friends are inclined to bestow upon me, I cannot but feel it a nervous thing for an humble individual like myself to be thus called upon to occupy the situation in which I now stand. It has been my lot, at some times and at distant intervals, to speak to small sections of my fellow-countrymen on subjects connected with their common interests—the agricultural interests of the land; but I have not anticipated being called upon to address a meeting so distinguished for rank, so imposing in numbers, and so important in character, as that which I now have the honour to survey around me (*cheers*). The toast which has been unhappily committed to my hands, is that of the labouring classes; a subject to which none could feel indifferent, whether regarded as involving the welfare of so large a portion of our fellow subjects, or exercising, as it does, so powerful an influence on the general well-being of society, and on the whole moral atmosphere in which we live. I should have satisfied myself with making these remarks and announcing the toast which had been entrusted to my care, had not that toast been committed to me with a request, that as I am considered somewhat more conversant with the circumstances of the labouring classes than some other gentlemen, I should accompany it with a few remarks, which I should not have made, had I consulted my own feelings on the present occasion (*cheers*). Those whose lot in life compels them to labour for their daily bread, although by good management and good conduct they may do much to increase their comfort and respectability, cannot greatly alter their condition or improve their circumstances by their individual exertions. The employment on which they depend for the support of themselves and their families, must come from sources over which they can exercise no control. We must then look to others than the peasantry themselves for any material improvement in their condition. The tenant farmers are the parties generally by whom the peasantry are employed, and much might be done by their consideration and kindness. But then, again, the means which the farmer employs and the spirit with which he cultivates, depend greatly on the terms on which he holds and the encouragement which he receives from his landlord; and thus the various classes of society are dependent one upon another, and a direct chain of communication is established between the owner and the tiller of the soil. It was admitted on all hands to be the duty of the landlord to supply suitable dwellings for the labourers on his estates, and it is his duty as well as his interest to let his land to such tenants, and on such terms, as are likely to ensure its good and liberal treatment; and just in proportion as a liberal system of cultivation prevails will the welfare of the labourers be. No one can have travelled through the different provinces of this land with much observation, without having discovered that the condition of the peasantry is generally a sure index of the state of cultivation in any district. If they be found well housed, well clothed, and of cheerful aspect, then be assured they are well employed and well paid; but, on the contrary, if we see them with comfortless and ill-furnished dwellings, themselves ill-clothed, and their children ill-educated and of squalid aspearance, then as surely shall we find that district ill-cultivated and unimproved, so certainly and so sympathetically do they act and react the one upon the other. Much of the land in England, I regret to say, is still held by tenants-at will, or on annual tenure; and no system, I believe, is more calculated than this to put a check upon extensive and spirited improvement (*loud cheers*). Two things are indispensable to the good cultivation of the soil. The one is, adequate capital in the hands of the occupier; and the other, the knowledge which is necessary to apply that capital to profitable and beneficial use. But the uncertainty of annual tenure, and the consequent absence of good cultivation, deprives the occupier of the means of obtaining capital, and of the inducement to acquire knowledge: it leaves the soil in a state of comparative sterility, and the tenancy in a state of stationary ignorance (*loud cheers*). I know it is alleged in favour of this system, that such a good understanding prevails between landlords and tenants, that changes of tenancy rarely occur, and that the confidence so engendered makes up for the want of more ample security; and I am willing to admit, in its fullest extent, the existence of kindness on the part of the landlord, and of gratitude on that of the tenant. I am willing to recognise the feeling of mutual regard and of reciprocal obligation and attachment, so existing, as one of the sweetest ingredients in our cup of social intercourse; but is that feeling of necessity stronger and more genuine in the case of tenants-at-will, than in that of the more independent and more spiritedly improving tenants, who hold upon lease, and do not grudge the improvements they make, knowing that they have time on hand to reap the benefit, and also that they have landlords capable of appreciating the value of good tenants, and willing to give them a fair preference at another letting? I could tell, were this a time to particularise, of farms which have descended from father to son by renewed leases for very many years, and which have advanced under them from a rental of £200 or £300 a year to one of eight, nine, and ten hundred, without outlay by the landlord beyond the erection of needful buildings, but which under yearly tenancy would never, I am satisfied, have reached more than half that amount (*hear, hear*). It is nevertheless a pleasing sentiment to entertain, and it has been sweetly said and sung, that

"The farm I now hold on your honour's estate
Is the same which my forefathers tilled."

This, my lord, is pretty in language—it is poetical in sentiment; but let us see how it bears in the case of tenants-at-will not only on the income of the landlord and the condition of the labourer, but on the interests of the community at large. Let us see what it is when reduced to the matter of fact prose which experience teaches. It would tell, I imagine, something in this way. "My forefathers occupied your lordship's farm, and I occupy it now. My grandfather farmed this land 60 years ago, an industrious but ignorant man: he made a living and brought up a family. My father succeeded him, and did likewise; and here am I now treading in their footsteps. It is true no improvements have been made, but then the rent has been little advanced. It is true that where rushes grew 50 years ago, rushes grow now; but then we have incurred no expense. It is true that the same wasteful, crooked, and inefficient fences that my grandfather patched and mended, I patch and mend still; that the same undrained land which he ploughed I plough now; and that I reap at this day crops as scanty as those which he reaped." (*loud cheers*). I have been told by a gentleman in this room that tenants-at-will with whom he is connected don't desire to have leases. That, however, is not the universal sentiment, for there are tenants-at-will, and I regret to say, in this county and in my own neighbourhood, who see the improvements beneficially carried on in other estates, and would anxiously imitate them if they could have leases, but they can't (*hear, hear*). There are, however, some who don't desire leases, I am told. It is so. And as I know something of that class of people, of their opinions and sentiments, I shall tell you why. They argue, my lord, in this way:—"If we should take leases and improve the land, higher rents will be exacted, and perhaps others seeing our improvements may covet our farms and come into competition with us at our next taking. So long then as we are left undisturbed and allowed to go on in our own way, let us be content as we are. It is not for us to trouble ourselves about Mr. Parkes, and Mr. Smith, of Deanston; about drain tiles and drain pipes, guano, nitrate of soda, and such new fangled affairs" (*cheers and laughter*). And so, my lord, it is, that they come to the philosophic conclusion that "'tis better to bear the ills they have than flee to others that they know not of" (*loud cheering*). We have been told by the noble duke on the right (Cleveland), that, unlike machinery and manufactures, there is a limit to the improvement and productiveness of land. I am not at all nervous on that point—that limit will not be arrived at in our days (*a laugh*). So long as any land in the country remains undrained and unimproved—so long as annual tenure prevails in any district, we shall not have reached that period (*cheers*). No, my lords and gentlemen, you may rest assured that annual tenure is incompatible with large improvements. Generally speaking, both the capital and the knowledge to carry them out are wanting; but if those existed, what man would be so foolish as to lay out his money in improvements, when, by some change of circumstances, another might step in to reap the benefit? (*cheers.*) How can he tell how soon some cause of disagreement may arise between himself and his landlord—or how soon, in the mutability that attaches to all human affairs, another Pharaoh may arise, who knows not Joseph? (*cheers.*) No man of sense will sow where he has not the certainty of reaping, or invest capital in improving land which he has not a pretty sure prospect of recovering. It is, my lord, on lands ill-tenanted and ill-cultivated that the labourers are least employed and worst paid. But, my lord, the duties which we owe to the labouring classes, whether as landlords or tenants, or British subjects, are not all fulfilled by giving them employment at adequate wages, and supplying them with dwellings conducive to the comforts, conveniences, and decencies of life—no; they have still higher claims on our help and guidance, for they have minds to cultivate and souls to care for as well as bodies to feed and to clothe (*great cheering*). And if we would elevate them in character and in feeling; if we would lay open to them those fair fields of intellectual enjoyment, from which by reason of ignorance they are too generally excluded; and if, above all, we would teach them to live and to act under an abiding sense of the high obligations, which as moral agents and accountable beings are imposed upon them, we must provide for the rising generation a better system of education than their fathers have enjoyed, and that education must be blended with moral and religious instruction (*loud cheering*). This, my lord, opens to my mind so wide and attractive a field of discussion, that I must not at this hour venture to enter upon it; but it is easy to advert to the circumstance of our sister land, where, by a widely diffused and easily accessible system of education for the lower classes, many men have arisen from their ranks who have been distinguished in the highest walks of literature and science—men who like Leslie fathomed the depths of philosophical truths, or like Leyden climbed to the topmost heights of human learning (*cheers*). But, my lord, the value of such an establishment is to be estimated far less by the occasional development of extraordinary genius and talent, than by the general diffusion of knowledge over the great mass of the people (*loud cheers*). I feel that I have detained you too long; allow me to thank you, my lord and gentlemen, for the indulgent hearing with which you have favoured me, and in proposing "The labouring classes," to express the wish that the hamlets of our peasantry may long send forth the shout of health and of joy. Long may the golden harvests, that robe our fertile plains, be gathered by them in peace and in plenty; and very long may all classes in this favoured land, combining their efforts for the general good, present to the world the spectacle of a powerful and prosperous—a happy and a loyal people (*immense cheering*).

DISEASE OF THE POTATO.

The potato crop of the present year is attacked, so far as the leaf is concerned; there is now no doubt of the fact, and it manifests itself above ground—first, by one or two black spots, as it did in 1845, upon one or more leaflets, not contiguous perhaps, but even very remote from each other; these may or may not spread rapidly, according as the attack is violent or mild. It is not, however, my present object to describe appearances; what I wish is, to point out and call the attention of physiologists to phenomena which we have detected here by protracted microscopic observation. I beg, however, in the first instance, to state two or three assured facts, proved to me by my own experiments and subsequent attention to results.

First, then, as I before stated, I see no reason for a moment to entertain the opinion that the diseased tubers of 1845 produced any tendency whatever to the malady of the present season; in proof, I copy from my Horticultural Memoranda the following roughly expressed items:—

"1845. Potatoes suffer by disease—first seen in the fine crops of the front orchard. August 8th.—Tops cut off from the reds; white Champions and the 'July' picked and stored in September, the rest in October; one-fifth, perhaps, injured. These tend to vegetate—and 7 rows, 30 inches asunder, whole tubers chiefly, planted mid-November (all dusted with air-slaked lime) 5 or 6 inches deep."

I found these rows to remain so long inactive—although the eyes of the sound parts were very strong at the time of planting—that I put an early kind in rows between them; and these vegetated pretty early. At length, late in spring, those first sown appeared; a few blanks occurred, and there the old tubers had wasted away; but all the rest grew firmly, and with as much vigour as the exceeding drought and heat of May and June allowed. Moisture, in fact, was so deficient, that when the earlier sort was raised, the lime was found completely dusty; and this state of the ground, baked by the unwonted heat of the sun, was the cause of that secondary and even tertiary production of young and worthless tubers, by which I and thousands of growers are sufferers in point of scanty production.

My winter potatoes were stored on the floor of a dust-dry barn, covered with new straw and a rick-cloth. From time to time they were picked over, and the defective removed. Disease, when once formed in a tuber, certainly made some progress during the mild winter, but to no comparative extent. At the final sorting, I directed the person to throw the half-barrow of affected tubers upon a heap of litter near the fence of a field, but perfectly exposed; and on these was thrown a parcel of damp straw and broken sproutings; this was done late in April. In a short time, I perceived shoots protruding; these formed a mass of healthy verdure, which remains now, this 13th of August, the haulm strong, a yard in length, matted together—the summits producing blossom. I see no disease, but find all the growing shoots surrounded by perfectly blackened remains of old rotten potatoes that could not produce shoots. *Thus disease is not communicated by contact with tubers, however rotten, to the young developments from others; all tainted,* indeed, but not irrecoverably so.

Again, *ground does not propagate disease;* for the very orchard in which I grew my last year's winter store, and where every variety had more or less of taint, was planted again. Every portion of it, so far as I can discern, is covered with verdure in the highest condition of health, and equally beautiful; for the mass of blossom upon it is exceedingly abundant. One day may bring the spot; but as yet I cannot see it, although the disease is said to be more early prevalent than it was last year. The seasons bear no comparison. In ascribing it to cold, swamped earth last year, the tissues surcharged with watery juices, and violently acted on by the fugitive but intense heat of June 10th to 14th, and July 5th, we found something like a rational appeal to meteorological agencies; but now, with 10 weeks of consistent heat, clear sun, lively wind, and dry ground, what becomes of our aqueous theory?

Having thus produced negative facts—admitting that disease does exist, and has begun with me since the last week, and upon plants particularly those where I had the least reason to dread it, while others have thus far escaped which ought to be in the worst condition, if the contiguity of polluted matter had aught to do with it—I approach the main object of this communication, and only regret that it cannot be immediately placed before the inquirer into natural causes and their phenomena.

Does the malady originate in the tuber? or in the leaf?

These are questions of no trifling import.

I have read much during the present year, and now have before me the recondite series of articles published on the "Potato Disease" in No. 13 of the *Journal of Agriculture*. I learn nothing from it, so far as the malady of 1845 was concerned; but at pages 347 to 349 I think I discern evidences of facts which *will be* substantially confirmed.

The following offers a condensed view of the subject:—

"The disease of the tuber was *not* a necessary consequence of the withering of the leaf and stalk. I, and others besides, have often found healthy potatoes attached to withered stalks with diseased leaves. All that has been said or written against this view is only founded on theories taken without consent of nature."

I respond to this—*True to the full extent, by personal experiment proved and established!*

The author of a pamphlet — Professor G. Vrolik, of Amsterdam—has embodied in half a page, under six heads, the general conclusions he had arrived at. Thus—

"1. Potatoes of the same kind and condition placed in different soils have produced diseased tubers in the one and healthy tubers in the other soil.

"2. The opinion that the disease, after having commenced at the top, descends into the tuber, the disease of the latter being thus an effect of that of the former, has appeared entirely unfounded.

"3. The leaves and stalks, however diseased and covered with the fungi they may be, *have not the power* to transfer this disease.

"4. Diseased potatoes, however mixed with sound ones, do not impart to them their degeneration, provided the latter be unwounded.

"5. Degeneration, however, is speedily produced when a wounded sound potato is exposed to the diseased tissue of a rotten tuber.

"6. It would appear that diseased potatoes, planted in an infected soil, can produce sound fruits."

My own undeniable experience substantiates every one of these positions, and therefore I hesitate not to say—the cause, or causes, and actual course of the evil are not known, or referrible to any ascertained primary agent.

Do we, then, presume that with the black spotting of the leaflet commences the progress of the disease? A leaflet—that is, one of the pinnæ of a leaf—appears marked with a brownish-black spot on its plate between the veins; in a few hours ten leaflets to one become thus blotted, the footstalk of the entire leaf loses its elasticity, and falls against the stem. Decomposition speedily follows, the whole verdure is lost, the plants appear burnt, and the stems become marked with tawny-red blotches.

Let us examine the first spottings. On inspecting the leaflet, its appearance suggests the idea of a sun-scald through a drop of water acting as a lens; but when more closely observed, the upper surface is occasionally seen to be more glossy around the wound, and of a darker hue. Upon the under surface, the spot itself shows entire decomposition; the tissue is gone, and has become crumbly as burnt paper; but all around it, to the extent of double its diameter, the under cuticle is suffused with a white, faint mealiness. *This white substance* removed carefully with the membrane by a lancet or fine knife, and transferred to the glass stage of a Ross's microscope, with a magnifier of 1-10th inch focus—a strong light sent through it—forms a most beautiful object. It is manifestly a mildew (*erysibe*), small, delicate fibres from a point, and form a plant; some have two, four, or five of these transparent fibrous branches, some are single, and occasionally one supports at its summit an irregular, brownish, sponge-like knob. As there are hundreds of these plants around one spot, a complete forest of white transparent processes is revealed by a magnifier so powerful. We discover none of this mealiness on the upper surface, neither any of it upon or near the blotches of the stems; but be it and its origin what they may, are we to consider it as the prime acting cause? I think not; for by analogy, if the skin of a plum, a grape, a pear, be punctured, the tissue under the wound speedily runs on to chemical decomposition, and mould appears; this mould is not a *cause*, but the result of a wounded or abraded surface. Hence I still—while abandoning any reference to a wet or dry, cold or hot state of weather and soil—incline to look to atmospheric electricity as the exciting cause; and as over this we have no power, there appears to be no remedy, save the entire cutting over of the haulm.

I am satisfied that, weeks since, ere one leaf-spot was seen in my plots, a tuber of the middle early "prolific" variety of kidney was occasionally raised, dotted under the skin and amid the pulp with the pale red tint of incipient disease. As, moreover, the *tuber-bearing processes* are independent of the *sap-absorbing roots*—the two being separate systems, performing different functions—it appears that there may exist *taint of tuber* without any connected disease of *foliage*, and *vice versâ*.

Time will balance the account; meanwhile better crops will be more cherished. J. Towers.

August 13.

DISEASE AMONG CATTLE. — Throughout the entire of North Wales a distemper is raging among the milch kine, in some places to a frightful extent, and for which hitherto no cure has been found. The cattle are seized with a low fever, which, in the course of a few weeks, turns into a rapid consumption; the bowels are severely acted upon, so that everything passes through them without affording the slightest nutriment to the animal, and death soon ensues.—*Carnarvon Herald.*

ON THE USE OF SUPERPHOSPHATE OF LIME, PRODUCED WITH ACID AND BONES FOR MANURE.

BY W. C. SPOONER.

(Prize Essay of the Royal Agricultural Society.)

The difficulties under which the pursuit of agriculture has for some years laboured—the importance, and, indeed, the absolute necessity of raising the largest crops of roots at the least possible expense, afford ample reasons for the council of the Royal Agricultural Society of England proposing as a subject suitable for a prize essay, "The Use of Bones with Acid," which on high authority has been designated "the most important saving which was ever held out in the use of manure." If any additional reason were required why the utmost attention should be devoted to this important matter, and the most extended information gained respecting it, it may be found in the fact that while the constantly increasing population of this country demands a corresponding augmentation of animal and vegetable food, the sources of supply both of bones and guano are likely to become greatly diminished. Thus, not only as it affects the interest of the occupier and owner of the soil, but also on national grounds, is the subject of our essay worthy of the deepest consideration. The superior economy of employing bones mixed with an acid, over that of using bones alone, is no longer a hypothetical or even a probable statement, but an established fact; and though I shall have to offer some results in corroboration, yet I do not hold them as essential to the subject, so fully has the success of the mixture been established from the numerous experiments related in the Journal of the Royal Agricultural Society, and more particularly in the excellent and elaborate essays of Mr. Hannam. And though I shall find it necessary to pass rapidly over all the various branches of the subject, yet my claims for honorary notice will principally rest on affording such practical information on points hitherto but briefly attended to, as may, I hope, render this essay of really practical and pecuniary value to agriculturists in general.

The specific effect of bone as food for the turnip-crop has long been known—long, indeed, before science was in a position to explain the cause of its peculiar effects, or to assign correctly to what portion of its constituents the benefits are chiefly due.

It was found, greatly to the surprise of many, that burnt bones, in which of course the organic parts had been destroyed, were equal, if not superior, in their effect to bones so treated; and that when boiled, in which state the fat had been expelled, they were more productive than bones in a fresh state. It was thence supposed by those who jumped to conclusions too hastily, that the substances thus expelled were useless at any rate for the turnip-crop, and they were apparently supported by the theory of a very eminent chemist, who, if we mistake not, laid it down as his opinion that the value of manures depended principally, if not entirely, on their inorganic ingredients—a doctrine altogether at variance with the previous generally received notions, that ammonia was the true fertilizing element, and that its amount afforded the measure of the value of manure. *In medio tutissimus ibis*—the truth, we take it, will be found to lie between the two extremes. We may justly regard the inorganic constituents as being the most important and essential portion of manure, affording to the plant what the skeleton does to the animal, the basis of support; and, as plants can obtain no other supply but through the soil, we may justly regard them as *the* most essential constituents.

The other elements are, to a great extent supplied through the atmosphere, and even nitrogen and its combinations may be thus furnished. The avenues through which this atmospheric supply is furnished are the leaves of the plant, and their size afford a correct criterion, *cæteris paribus*, of the amount of nutriment derived from the ærial source. Thus beans and other pulse obtain more food from the atmosphere than cereal plants; roots more than the former; and wheat, from the small size of the leaves, less than any. Thus only can we account for the striking fact that if we give a good supply of inorganic elements *only* to the turnip-crop, we shall very probably have a plentiful crop, whilst if these be absent, however rich the manure may otherwise be, the crop will be a failure. Not that we must therefore draw the conclusion that the organic manures are of little or no importance to root crops: they are of value, and particularly to the grain crops which succeed.

The organic matter which composes about one-third the substance of bones is, however, so intimately combined with the earthy portion, and their disunion is accomplished with such difficulty, that the good effects of either are to a certain extent neutralised, at least so far as the first crop is considered; and we are consequently obliged to supply five or six times as much as the crop actually requires, and to render them available by means of pulverization. It is on this principle that the assistance of sulphuric acid is sought for and obtained: it serves by its chemical affinities to separate the component parts of the bones, and render them more soluble and available as food for plants. In the excellent and accurate experiments of Mr. Hannam, related in a former number of the Journal, it was clearly proved that fresh bones when ground were superior to boiled ones, from which the fat was extracted; and the latter were superior to burnt bones, from which the gelatine was also removed. This result was, however, far more striking when the bones were dissolved in sulphuric acid, a difference of nearly 2 tons of turnips being observed, whilst with the bones merely ground a difference of 17 cwt. only was exhibited. From the same experiment we likewise learn that the beneficial effects derived from the earthy part of bones are 4½ times greater than that derived from the organic parts. I refer to the Journal for the particulars of these experiments, and to the previous number for other statements, from which, if we had no other evidence, we should be justified in drawing the conclusion that 20s. laid out in bones and acid will go much further than 40s. expended in bones alone, so far as the turnip-crop is concerned.

These experiments, however, appear to have been made with the addition of a very considerable quantity of water, so as to apply the manure to the land in a liquid state, which, without denying its superiority, is yet attended with such difficulty, trouble, and inconvenience, that it is vain to expect that farmers generally would incur it. The expense of a proper cart for the application of this manure in a liquid state is very considerable, and sufficient to prevent its general adoption. And, although it was in this form that the public were first made acquainted with its valuable properties, yet its general adoption must be attributed to the additional discovery that it can readily be applied in the state of compost by means of the common drill. Having directed my attention to the preparation and employment of this valuable manure in the form of compost, I am in a position to state that by its means one-half the usual expense in the purchase of bones may be saved.

We cannot, however, do better than take as our text, or rather the heads of our subject, the points to which the attention of competitors are drawn by the Council of the Royal Agricultural Society of England, which are—

1. State of Bones.
2. Proportion of acid in a given weight of bones.
3. Proportion of water, if any, mixed with the acid.
4. Mode of mixing the bones with the acid, and of preparing the compost.
5. Effect of various quantities applied in combination or comparison with common bones and other known manures.

1. First, then, the state of the bones—with regard to which I have merely to observe that they should be as fine as possible, but the ordinary state of bone-dust will answer the purpose very well. The dust is decidedly preferable to half-inch bones, for, whilst the increased weight of the former will compensate for its greater price, the points of contact being greatly increased by sub-division, the bones are more rapidly and more perfectly acted on by the acid, and require, in fact, a less quantity both of that and of water.

We next come to the second and more important point.

2. The proportion of sulphuric or muriatic acid to a given weight of bones.

Sulphuric acid is preferable to muriatic acid for several reasons—it is stronger, cheaper, has greater specific gravity, and contains much less water. On mixing it with water, a much higher temperature is attained, which conduces to the dissolving process, particularly of the organic portion of the bones. In addition to these reasons, we find that in the trials which have been made, muriatic acid has been found somewhat inferior. I have, however, been rather surprised that there should not have been a more decided difference than proved to be the case in Mr. Hannam's experiments: and we can only account for this by bearing in mind that the lowest proportion of muriatic acid employed was one-half, which was perhaps sufficient to affect all the phosphate of lime contained in the bones, whereas, if one-third had been employed, as was tried with the sulphuric acid, the result might not have been so favourable for the muriatic acid. Besides this, probably the muriate of lime formed by the muriatic acid is more fertilizing and soluble than sulphate of lime formed by the sulphuric acid; and, from its great attraction for moisture, particularly advantageous in such a dry season as that of 1844. It is, therefore, by no means improbable that an equal quantity of bones prepared separately with the two acids, and afterwards mixed together, might be more productive than bones prepared with either acid alone.

The proportion of sulphuric acid most desirable to employ is a very important point, inasmuch as it has been shown that sulphuric acid alone, or mixed with water, possesses very little fertilizing powers. This, probably, is owing to the circumstance of the soil generally containing a sufficiency of this element, and to the fact that phosphoric acid is so extremely essential, particularly in the early stages of the growth of the plant, that it will not prosper without it, whatever we may otherwise employ as manure. A neighbouring agriculturist during the last year tried to raise a crop of turnips with a good dressing of salt and soot, which contain no phosphoric acid though plenty of ammonia and other fertilizing ingredients, but the result was a total failure. In a garden experiment, I may here observe, I found sulphuric acid and water succeed as well as bones in raising turnips, but the soil no doubt contained phosphoric acid, as well as alkalies, on which the acid could act favourably.

Before we authoritatively pronounce on the quantity of acid necessary to be mixed with the bones, it will be better to inquire into the nature and properties of the substances we propose mixing together.

Sulphuric acid, or oil of vitriol, as it is more frequently termed, consists of the union of two parts by weight of sulphur with three of oxygen gas, and its strength depends on its purity and freedom from water, for which it has a remarkable affinity, so much so, that if exposed to the air it will quickly absorb water from the atmosphere. Its relative weakness, therefore, is owing to the quantity of water mixed with it. In speaking of sulphuric acid, I must be understood to mean in its concentrated state, possessing a specific gravity of from 18.45 to 18.50. And it should be borne in mind, in purchasing the acid, that 50lbs. of the above is at least equal to 60lbs. of the specific gravity of 1.714, and therefore if the weaker acid is used, its quantity must be increased in proportion to the diminution of its strength.

On applying the vitriolized bone to the tongue, we find that it tastes both sour and sweet. The sourness arises probably from the phosphoric acid, and the sweetness from the gelatine sugar, which is formed by the action of the acid on the gelatine, converting a substance very difficult of decomposition into one readily soluble, and which can be easily absorbed by plants. When concentrated acid is mixed with a quarter of its weight of water, the temperature of the mixture is raised to 300°, and boils away at a great rate. The action of this heat on the animal part of the bones renders it of a dark colour; but if a small quantity of acid only be employed, the mixture is white, from the carbonate of lime which then predominates. From an average taken from several analyses of bones of man and various animals, the following appears to be tolerably near the mean;—

Organic matter, consisting of gelatine, cartilage, and fat	34
Phosphates of lime and magnesia . .	59
Carbonate of lime	7
	100

Or, in rough numbers, the organic matter may be regarded as forming one-third, and the earthy portions two-thirds. Of course, if the bones are very fresh, the former will be in larger proportion than one-third; thus Mr. Hannam gives it as 45 per cent. The above, however, may be considered as a fair average in the state usually employed by farmers.

Four bushels of bones, which may be considered to be a fair allowance for an acre, will weigh in a fine state of bone-dust about 180lbs.* This quantity contains 12½lbs. of carbonate of lime, consisting of carbonic acid 5½ parts, and lime 7 parts, which will require 10lbs. of sulphuric acid to convert it into sulphate of lime or gypsum. This is the first result of the mixture, and is the cause of the very unpleasant fumes which are given off, and which consist in fact principally of carbonic acid disengaged from the carbonate of lime in consequence of the superior affinity which lime has for sulphuric acid. This result takes place before the acid acts on the phosphates of the bones, and thus it is that when a small quantity of acid has been sprinkled over bone-dust, the good effect has been but moderate, the carbonate of lime alone has been acted on, and the phosphate of lime has remained undecomposed.

The quantity of phosphate of lime existing in the 4 bushels of bones is about 106lbs., containing 47 lbs. of lime and 59lbs. of phosphoric acid. If we consider superphosphate of lime to contain a double portion of acid—a fact, however, not quite decided—then 33lbs. of sulphuric acid will be required, which by uniting with half the lime, or 23½lbs., forms gypsum, and leaves the other moiety of lime united with a double portion of phosphoric acid in the state of a superphosphate. Thus, 43lbs. of acid will be required to effect these changes, leaving any additional quantity for other purposes.†

Phosphate of lime is a substance very difficult of solution, and thus in a very dry season the effects of bones are often very slight and imperfect. Superphosphate of lime, on the other hand, is extremely soluble, so much so that the vitriolized bones can be entirely dissolved or suspended in water, and thus applied. This at once explains the cause of the valuable properties of the preparation. The bones in their natural state are extremely indigestible, the acid cooks them—converts them into a species of soup which can readily be eaten and digested by the young turnips. The adamantine fetters with which the various elements composing bones are bound so compactly together, are, by means of this new agent burst asunder—the compact is broken, and each constituent element is left to pursue its own course and to exercise its own natural affinities. The chemical changes which take place between the sulphuric acid and the organic portion of the bones are no doubt very complicated. Sugar is one result, and probably sulphate of ammonia is another; but I cannot venture to state what quantity of sulphuric acid may be necessary to effect these changes. If we presume that one-third is the proportion of sulphuric acid employed, then there will remain 17lbs. to act on the organic portion of the 4 bushels of bones, the remainder having been required by the earthy portion.

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* I find that the *average* weight of bone-dust, as it comes from the mill, is 168lbs. per 4 bushels, although I *have* found it reach the weight stated in the text.—Aut.

† I do not mean to say that these are the precise changes which take place, but only an approximation to them. Probably some portion of phosphoric acid may be left in a free state in the prepared mixture.

We find that manufacturing chemists, in the preparation of phosphorus from bones (now largely required for lucifer matches), first destroy the organic part of the bones by means of fire, and then mix the remainder with half its weight of sulphuric acid. Thus, if we suppose 180lbs. to be the quantity employed, by burning it will be reduced to 120lbs., requiring 60lbs. of acid to form superphosphate, which would be one-third the weight of the bones previous to burning. I suppose, however, that in this case an excess of acid is required to render the process complete, as one-half would otherwise appear to be more than the quantity demanded.

From these and other reasons we may justly consider that the proportion of acid to the bones should never be less than one-third nor more than one-half. The former, I think, is the most economical, but probably the precise quantity most desirable will be 42 per cent. of acid. I may, however, observe that in an experiment during the last season, in which one portion of the land was manured with bones and acid in different proportions, that which had more bones and less acid proved to be a somewhat better crop than where fewer bones and more acid were used; the expense being the same in both instances.

3. The proportion of water to be mixed with the acid will next receive our attention.

When one part by weight of water is mixed with four of acid, the temperature is raised to 300° Fahr. It is, therefore, very desirable that sufficient water should be used to produce this great heat, which facilitates the dissolving process; and the quantity above stated, or, if more convenient, the same measure of water as of acid, which will be rather more than half the weight, will be a very good proportion. More should not be used, as no useful purpose will be accomplished. In an experiment tried last year with different proportions of water, I could not detect any difference in the result. The water should be applied first by means of a watering-pot, so that it may be intimately combined with every portion of the bones. This is an important point, and greatly facilitates the dissolving process, which without it is very likely to be imperfectly accomplished.

Another reason for applying the water first is, that the bones becoming partially saturated, the acid, from its great affinity for it, rushes as it were into the pores of the bones in search of the water, and thus the bones become more rapidly and perfectly mixed with and acted on by the acid. When no water is employed, and the bones are not entirely in the state of fine dust, as they never are unless purposely sifted, the surfaces of the small pieces of bone become acted on by the acid, and a coat forms around them which seals up the interstices of the bones, and prevents the acid from penetrating. I have no doubt this is often the case likewise from careless or imperfect mixture, and the good effects of the manure are thus materially diminished.

4. Mode of mixing the bones with the acid, and of preparing the compost.

It has been recommended that a large heap of ashes or mould should be made with a hole or depression on the top, in which the bones are to be placed, the acid poured over them, and after some time the whole shovelled up and mixed together. Now, if we examine into the effects of this mode of procedure, we shall readily perceive the objection to which it is subject. The ashes, no doubt, contain a considerable portion of carbonate of lime besides other salts, for which sulphuric acid has a very strong affinity. Thus the bones are robbed of a large proportion of the acid, of which they ought to have exclusive possession. And even if common mould is used, or any other substance which has no particular chemical affinity for the acid, still this mould will mechanically absorb much of the acid, and thus deprive the bones of it.* I hold it, therefore, as a point of much importance that the whole of the acid should be directly applied to the bones, and that no other substance should be allowed to intercept or abstract their mutual affinities.

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* I have not found that any considerable quantity of the acid passes through the bones into the heap of ashes or earth; and though Mr. Spooner's is the better plan, where his apparatus can be easily procured, I still think that the expedient I mentioned may be found sometimes convenient.—Ph. Pusey.

A very convenient and cheap vessel for manufacturing the mixture is a sugar hogshead, having its holes stopped with plaster of Paris. It is very desirable to avoid if possible any measuring or weighing of the acid, as it is so very dangerous a substance to handle. Many serious accidents occurred to my knowledge during the last year, and it is very difficult to impress farm servants with a sufficient degree of caution, or even to convince them that a liquid which appears so colourless will burn their skin and clothes. In emptying a carboy of acid even into a tub it is difficult to prevent a little slopping about and damaging the clothes of the attendants, as well as the basket, &c., which contains the carboy. To prevent these unpleasant consequences I have adopted the following plan:—The carboy is placed on a stage or cask the same height as the sugar-hogshead, into which is put the precise quantity of bone-dust we intend mixing with the carboy of acid. The water is now added with a watering-pot having a rose at the end, so as to disperse it thoroughly, and the carboy of acid is then emptied by means of a syphon. This syphon is formed of a piece of block-tin pipe, which can be bent into any form, about ¾ of an inch in calibre, and 4 feet in length. A brass cock is soldered to the long end of the syphon, on which the rose of a watering-pot may be placed. The syphon is now filled with water, and its long end closed with the cock, and the small end with the hand or finger. The latter is then quickly inserted into the mouth of the carboy, the cock turned on, and the acid will continue to flow till the vessel is nearly empty, without any assistance, so that the attendant has no occasion to expose himself to the injuries and offensive fumes which almost immediately begin to escape. He may, however, approach the windward side of the tub, and give the mixture a little stirring, which should be continued for some little time afterwards, so that the mixture may be complete. A convenient utensil for this purpose is a fork with two grains, long in the grain, bent at some distance from the grains nearly at right angles, and fixed in a wooden handle. On the same day a fresh lot of bones may be added, and the process repeated until the hogshead is nearly full. In two days afterwards the mixture may be shovelled into a heap, and either remain till wanted or mixed at once with a certain portion of ashes. It should be shovelled over several times and ashes added at each time of turning, which will thus render the mixture fine and dry enough to pass through an ordinary drill.

It must be evident that much of the value and economy of the manure depends on its being perfectly mixed, so that every particle of bone should be exposed to the action of the acid. In many cases I have no doubt this has not been sufficiently attended to, and the result has been either that more acid has been used than is really required, or that much of the advantageous effects has been lost.

By the method which I have here recommended, and which I have adopted after many trials, the mixture can be readily and accurately manufactured, and with perfect safety to the attendants.*

5 Effect of various quantities applied in combination or comparison with common bones and other known manures.

My own experience of the advantages of sulphated bones commenced in the very dry summer of 1844. Wishing to try their effects, and thinking that it was highly desirable to apply them as a compost by means of the drill (though I had not heard of any instances in which they had been so used), I resolved to make the attempt. I intended to apply the bones at the rate of 3½ bushels per acre, and half their weight of acid; but from not making sufficient allowance for the dampness of the manure, it extended over a large portion of land, so that little more than 2 bushels per acre were used with about 16 bushels of ashes. On the same day (in the early part of July) other portions of the field were drilled with bone-dust at the rate of 16 bushels per acre, and some parts with South American guano. The bones and acid swedes were the first to appear, and their tops grew most luxuriantly. The turnips suffered from not being hoed till they were too forward, but the crop throughout the field (considering the late period of their being drilled, and other unfavourable circumstances) was a very fair one, about 14 tons to the acre. The bones and acid portion was fully equal to the rest, and indeed somewhat better than where 16 bushels of bones had been applied to the acre.

Every alternate ridge was carted off, and the remaining half fed off by old ewes with no other food, with the exception of a little inferior hay. The field was then sown with dredge (a mixture of beans, barley, and peas), and the crop was a very excellent one; that where the vitriolized bones had been used was at the least fully equal to any portion of the field, and indeed somewhat superior to that dressed with bones alone. Thus it will be seen that the manure awswers perfectly well so far as the second crop is concerned; and there is now the prospect of a good clover crop.

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* In manufacturing a considerable quantity of the mixture to meet a large demand for the present season (1846), I have found much advantage from constructing various utensils of different shapes, so as to perfect the mixture without inconvenience to the attendants, as well as from other improvements in the manipulative process.—Aut.

The result of the preceding year having fully satisfied me as to the value and economy of vitriolized bones, I did not think it necessary to test their merits against other manures during the last season, particularly as other equally successful experiments had been tried and published.

But wishing to ascertain the most economical proportion of acid to be employed, I prepared two lots for a field of 6 acres. In one the bone-dust was at the rate of 4 bushels to the acre, and the acid one-third; and in the other the acid was half the weight of the bones, but the latter was diminished so as to reduce the cost of both lots to the same sum. The mixture in each instance extended over half an acre more than was intended, and was mixed with equal portions of ashes, viz., about 20 bushels to the acre.

The swedes came up well, and though attacked by the fly, soon got out of its way, and proved a very good crop. The average of the field, however, was very much reduced by the great quantity of hedgerow timber by which it was surrounded, and which spread its blighting influence a considerable distance. However much these trees might add to the beauty of the landscape, they certainly destroyed most effectually the beauty and uniformity of the turnip-crop, and reduced the average of the field several tons per acre. A good portion of the field appeared to average about 22 tons per acre, and the half where the larger quantity of bone-dust with one third its weight of acid was used, proved superior to the other, though whether to be attributed to the difference in the manure, or to the fact of that part of the field being somewhat drier, it is difficult to say.

The field was a clay loam on the London clay, and was partially drained.

I also supplied various agriculturists in my neighbourhood with vitriolized bones, prepared in the proportion of 4 bushels (180lbs.) of bone-dust, and 60lbs. of concentrated sulphuric acid, which I recommended to be applied to an acre when no other manure was employed, The result in nearly every instance has been decidedly favourable.

Mr. W. Gater, of Westend, employed it at the rate of 2 bushels of bones to the acre in addition to a fair dressing of farm-yard dung. On a portion of the field the dung was used alone. The former fit for the hoe several days before the latter, and on weighing portions of each in January last, there was a superiority of 5 tons to the acre in favour of that portion which had received the addition of sulphated bones.

Mr. J. W. Clark, of Timsbury, used the manure which I supplied him with in the same proportions also in addition to farm-yard dung, and the swedes proved the best on his farm. The amount of vitriolized bones used per acre varied in different parts of the field, and the goodness of the crop precisely corresponded to the quantity applied.

Mr. J. Blundell, of Bursledon, also used it at the rate of 4 bushels of bones to the acre, with 6 bushels of ashes in competition with night-soil and ashes. On visiting his farm a few weeks afterwards, I noticed, at several fields' distance, the superiority of one portion of the field, which I found was that on which the vitriolized bones had been used. The dampness of the season, however, proved so favourable to the development of the other manure, that on weighing them in December, the latter was found about half a ton per acre heavier; the expense, however, was nearly double. The weight of the crop was between 17 and 18 tons per acre. I have no doubt that if Mr. B. had applied 20 bushels of ashes to the acre, instead of 6, with the sulphated bones, the result would have been much more favourable. When we bear in mind the large amount of potash contained in the crop, it must be very evident that it is of importance to supply a good quantity of ashes which contain a fair proportion of potash; I would therefore recommend that 20 bushels of ashes per acre, at least, should always be employed.

Mr. Pocock, of Hickley, used the manure at the rate of 4 bushels per acre, and one-third acid, and was well pleased with the result, though he did not ascertain its amount.

Mr. Withers, of Luzborough, was another farmer to whom I furnished a quantity, prepared as before mentioned, and he reports very favourably of the results.

Mr. Fielder, of Sparsholt, was induced by my representation of its favourable effects to try the manure, and he found that on his light land on the chalk it answered admirably. Two bushels of vitriolized bones with ashes successfully rivalled a small portion of ground drilled at the rate of 60 bushels of bones to the acre for the purpose of experiment.

Although the vitriolized bone has proved very successful with white turnips, I believe that its peculiar excellences are most fully proved by swedes. I wished to ascertain this by experiment, and accordingly on the same day and on similar land, a clay loam, 3 acres were drilled with Laing swedes, and 3 acres with Matson's white globes after tares. The swedes proved decidedly superior both in the early and later stages, and though the roots, as might have been anticipated, were but of moderate size, in consequence of the very late time of drilling (early in August), yet on comparing a few rods without manure the difference was very striking. A small portion of the globes, drilled with ashes alone, also exhibited a similar inferiority.

It should be observed, however, that in this experiment the land was probably more suited for swedes than white turnips; but, on the other hand, the lateness of the season was more unfavourable to the swedes, besides which the crop previous to the globes had been manured with stable-dung, whilst the other field had received no dressing since 1843.

Supposing that these results are to be attributed to the greater suitability of the manure for swede, and not owing to other causes, the result is certainly in keeping with the comparative analysis of the ashes of swedes and white turnips, which tells us that the former contains 408 lbs. of phosphoric acid, and the latter only 73 lbs. in 100,000 lbs. each.

It must be evident from this circumstance that white turnips do not require so large a quantity of bones, whether vitriolized or not, and it also corresponds with the well-known facts that swedes require a larger quantity of dung to supply the necessary phosphoric acid, and also that white turnips on favourable land can be raised with ashes alone far more easily than swedes.

I would therefore recommend in all cases with white turnips, that a less quantity of vitriolized bone be employed, and that guano, or some other manure possessing its properties, should be used in combination with it.

In May last a portion of land consisting of 1½ acre was drilled with Matson's green top globes, and manured with 1 bushel of sulphated bones, 1 cwt. of African guano, and about 25 bushels of turf-ashes per acre. The crop was a very good one, exceeding 20 tons to the acre.

In several instances within my own knowledge where guano has been used with ashes, the crop has been destroyed by the pungency of the manure, probably owing to the ammonia which it contains. There is no danger of this taking place with vitriolized bones, and I have found, though seeds will not vegetate if entirely surrounded with them, they readily will if the manure is mixed with twice its weight of mould.

The last season has not been a favourable one for displaying the peculiar advantages of vitriolized bones, or rather, it has been from its wetness so favourable for common bones and every other description of manure, that an indifferent field of turnips has been the exception and not the rule. It is in a dry season when the fly is particularly rife and active, when crop after crop is destroyed by this entomological pest, that the advantages of ensuring a vigorous growth to young plants is properly appreciated. Amongst all the specifics or antidotes for the fly, there is none, I believe, equal to the employment of vitriolized bones. Hitherto I have not met with or heard of a single instance in which it has failed to force the plants out of the way of the fly. It is in a dry season, too, that the advantages of early and vigorous growth are shown, when the plant may languish for weeks for want of rain with ordinary manures, and thus lose time that never afterwards can be compensated for.

In a garden experiment tried on a small scale to show the effect of different preparations in forcing the young plant out of ground, I found the following results :—

1. Vitriolized bone applied in solution above the seed caused the plant to appear on the fourth day.

2. The same applied below the seed brought up the plant on the fifth day.

3. Vitriolized bones as compost brought up the plant on the sixth day, both when applied above and below the seed.

4. Sulphuric acid and water below the seed caused the turnip to make its appearance on the sixth day.

5. Bone-dust below the seed brought up the plant on the seventh day, the same time as it appeared where no manure was employed.

In the above instances, with the exception of the fourth, the expense of the manure was the same in each case.

GENERAL CONCLUSIONS.

From the facts and reasons which we have detailed and urged in our preceding Essay, as well as from information supplied by previous experimenters, we may deduce the following conclusions :—

1. That superphosphate of lime is the essential manure for turnips, and particularly for swedes. That with it alone a good crop can be raised; but without it the turnip will not thrive, however rich the manure may otherwise be.

2. In preparing the mixture, the bones should be in as fine a state as possible.

3. That sulphuric acid, from its greater strength and cheapness, is preferable to muriatic acid.

4. That water, in the proportion of one-half the weight of the acid, should be first sprinkled over the bones.

5. The proportion of sulphuric most economical to employ should not be less than one-third, nor more than one half the weight of the bones, and that probably the medium between these two quantities is most advantageous.

6. That the mixture can be applied either diluted with a considerable quantity of water by the aid of a water-cart, or with ashes by means of an ordinary drill. That though the former may be more speedy

in its effects, the latter can be more conveniently applied, and has the advantage of admitting the addition of a large quantity of ashes.

7. That vitriolized bones may be used either alone or with other manures, and that when the latter are at hand, it is more advantageous to use the former in combination with them. For instance, if there are 30 acres to be prepared, and only sufficient dung to dress 15 acres, it is better to give a half-dressing of dung over the whole of the turnip break, and make up the deficiency by means of sulphated bones. Thus the plant will be forced in its early, and supported in its later growth. For the same reason vitriolized bones may be advantageously combined with guano.

8. That vitriolized bones are equally advantageous to the second year's crop, when the turnips are either wholly or partially fed off with sheep.

9. That while the economy of this manure is thus proved by practice, it can be as readily explained thy theory, *e.g.*:—The tops of swedes are known to possess double the phosphoric acid contained in the bulbs. Thus, the superphosphate of lime in the manure causes the rapid development of the leaves—one of its peculiar properties. The leaves being thus early and largely developed, are enabled to extract a considerable portion of nourishment from the atmosphere, much more, indeed, than where the leaves are small and backward. The difference between the amount of food derived from the atmosphere by a forward and flourishing crop, and that obtained by a backward and dwarfish crop, is so much absolute gain to the farmer, or rather to the land. It costs nothing on the one hand, but yields considerably to the land if the crop is fed off on the other. A manure that would thus force on the turnip in the early stages of its growth, was long felt to be a desideratum by agriculturists. This want has now been supplied; and even if this were the only recommendation sulphated bones possessed, its discovery and introduction would still be a boon.

Lastly. The value of vitriolized bone may now be considered to be fully and fairly established. Its claims rest not on the assertions of a few experimenters. It has been tried during the last season by hundreds with success, and in the next it will be tried by thousands. It affords, in fact, a triumphant answer to the question—What has science done for agriculture?

Southampton, 27 *Feb.*, 1846.

⁂ The preparation of bones for turnips, as described by Mr. Pusey (being heated with ashes), and other substances, has been long practised with success; and this preparation causes a softening of the substance so much that the smaller parts become immediately proper for the food of plants.—J. Kimberley.

ON THE EFFECTS OF FREE TRADE IN PROVISIONS.

Sir,—My immediate predecessor was one of that class, who, having by well-applied abilities and persevering industry (not by railway speculations), amassed a moderate competency, considered the investing of a portion of his gold in the purchase of a small estate in his native county would give him a more important position in society without much reducing his income. This estate comprises about 200 acres, principally corn land, was valued, at the time of the purchase, to be worth 25s. per acre, and cost, in the year 1815, 7,000*l.* Since that time at least 1,000 have been laid out upon it in buildings and other conveniences for the tenant, and during the same period the rent has been reduced from 250*l.* to 200*l.* per annum, its present amount, being rather more than 2*l.* 15s. per cent. per annum interest on the original investment, without charging anything upon the outlay for improvements by the landlord.

Now, Mr. Editor, within these few days my tenant on this moderately sized farm, who is a very honest and respectable man, has been with me to inform me that, with the free-trade prospects, he fears he shall not be able to hold on my corn farm, and I see no alternative but to prepare for becoming a farmer myself, unless Messrs. Cobden, Peel, and Russell will find me a successor of the new school with a manufacturer's purse, in the place of my old friend and tenant.

My farm is divided into enclosures, varying from three to eight acres each, and has usually found employment for six horses and from seven to ten men and boys, besides occasionally women and children. There are some handsome trees growing in the hedge-rows, and, singly, upon some of the fields; and, under the old system, the occupier has evinced much pleasure in preserving for me, and showing me during a week in the month of September or October, a tolerable sprinkling of game: and, as I am fond of shooting, the good feeling engendered at these periodical visits has been, I hope and believe, reciprocally satisfactory and beneficial. However, to my inexpressible dismay, I am now told that to induce any competent tenant with capital to take my farm, I must grub up all my hedge-rows, cut down all my trees, do a little draining, give up my game, erect a small steam-engine, and reduce my rent. This is rather a serious list of reforms, and upon speculation only; more especially as in reference to the latter item I find that a reduction of 1s. a bushel, or eight shillings a quarter, only in the price of wheat will, according to the average produce of the neighbourhood, absorb the whole rent of all the land on which that grain is cultivated; so that on my corn farm, unless I give up all rent and pay the taxes too, I do not see, under the existing burthens of parochial and government taxation, and the present high rate of wages, how any tenant is profitably to grow heavily taxed English wheat so as to compete in the market with foreign, duty free.

Before, however, I take any decisive step, either in investing further capital in so unpromising an undertaking as that of converting my arable into grazing land, in the almost forlorn hope of meeting with one of that (now-a-days) rare species—a monied agriculturist in want of a farm, or determined upon submitting my little freehold to the hammer and eloquence of Mr. George Robins, I should be extremely glad to see in your columns, or in those of any of your brethren of the broad sheet, such a case as I have proposed fairly and calmly argued and answered by facts and figures.

It cannot, I think, be urged that I have been receiving an exorbitant interest in the shape of rent for my father's 7,000*l*. invested thirty years ago. My tenant and myself have invariably been on the best terms, and he expresses great regret at the idea of quitting a farm which he and his family have occupied for more than a century; but he affirms he has "done himself no good for a long time during a series of years in which he had only to compete with Irish and colonial corn and bacon;" but now that the untaxed produce of the whole agricultural world is to be unrestrictedly admitted into our markets, he says he cannot see how his rent is to be made, and fears to proceed.

I am not much versed in political economy, or very deeply read in "League Tracts," but I wish to obtain the soundest information on what I believe to be the most critical position in which the small landlord, his tenant, and the labourers are unexpectedly thrown, or with which they had ever before to contend.

As to the landlord, be he a large or a small holder, and whether he inherited his estate from ancestors, or purchased it himself with the produce of his skill and industry, he is surely equally entitled to a moderate interest upon the intrinsic value of his principal, whether it be in money, or invested in manufactures, or commerce, or in land, though in the latter case most men have been willing to take a lower rate of interest, from the solidity and immoveability of the security, for the "qualifications" it formerly conferred, but which are now equally enjoyed by the holders of every other species of possessions, and for the enjoyment of those rural pursuits and amusements which have always heretofore been considered appendant to landed property; these, however, if the land is to yield any rent, must all now be abandoned, and in their stead expensive alterations in building, draining, and denudation must somehow be accomplished, to induce a scientific agriculturist to make an offer for the occupancy of a large estate; but where is the modern farmer with money (and there is no farming without it) who will condescend to look at a little farm of 200 acres?

As to the hard-working, old-fashioned tenantry, it is "all up with them!" They cannot afford to sell in the "cheapest markets," and the manufacturers buy in no other; consequently, small indeed is the share of the mercantile prosperity which falls to their lot. It is only a few days ago that a most respectable man of this class told me he now pays annually in wages, poor-rates, and other parochial taxes, full double what he did twenty years ago, and that the value of farming produce has decreased certainly one-fifth in the same period; and he thus explains the startling assertion:—When he commenced business, the rate of wages was eight and nine shillings a-week for the best labourers, and they were contented and thankful to their employers; at the present day, in consequence of the demand for labour at the iron and coal works, he is obliged to pay twelve and thirteen shillings per week to men generally discontented, and disposed rather to be their own masters than his servants; and, moreover, that he is now compelled to keep three to perform the same amount of labour which was formerly better done by two; the various parochial burthens have very considerably increased both in number and amount, while the average prices of wheat per bushel have reduced from 8s. 6d. and 9s. to about 7s., and other produce in a nearly similar proportion.

If this be true, and I fear it is impossible to gainsay it, the prospect of 5s. a-bushel is indeed a fearful one, and my old tenant, with thousands of his fellows, must prepare for a cruel and most unmerited degradation: for it is self-evident that any such reduction of rent as even £20 or £25 per cent. would be of the most trifling permanent benefit to the tenant, while it would further reduce the landlord's rate of interest on his original investment to little more than one and a half per cent.

And as to the labourers, in consequence of the flourishing state of the iron and coal trades, and the scarcity of hands at new works, they can and do, at the present time, saucily command where they used cheerfully to obey, and a farmer must now pay from 12s. to 15s. a-week for half-days' work, or leave his crops to rot on the ground; and what makes this state of things ten times more lamentable is, that not in one case in a hundred is any portion of these exorbitant wages saved or put by for a "rainy day:" neither do you see the wives and children better fed or clothed, but by far the larger part is absorbed in those demoralizing and abounding sinks of iniquity, the beer-shops. This high rate of wages is, however, I think, very likely ere long to be reversed; and as soon as a free trade in corn shall have effected the ruin of the little farmer, and reduced the landlord's income and means of expenditure by the amount of his rent, which appears to me to be the almost inevitable result of the late measures of the legislature, I suspect it will be found that these beleagued manufacturers will then purchase their labour also in the cheapest market, and that as soon as the farmer's means are used up the manufacturing pay will be brought down; and then, indeed, it may be said "That the last state of these men will be worse than the first."

The new light measures are, however, now (thanks to the Judas-like betrayal of the Protectionists, by their leader on whom they confidingly and implicitly relied) "the law of the land," and doubtless they will have a fair trial before another parliament can be assembled, or my old tenant's "notice to quit" have arrived at maturity; and I should be delighted to find that his fears and my own are groundless. As, however, our case is only one of ten thousand of the same description I should be glad to see how the advocates of an unrestricted trade in foreign corn will answer these agricultural grievances; and I hope to hear as a matter of impartial justice, that the British barley growers are to be relieved of the malt-tax; and I expect to be informed where the promised compensation may be discovered, and when the counterbalance is to be settled.

It is indeed full time the landed interest should arouse themselves from their lethargic slumbers. I believe that ruin to all those who are entirely dependent upon agriculture, whether it be the owner of the soil, the occupying-tenant, or the labourer, is imminent, and will be overwhelming, unless this sudden and "severe blow and great discouragement" to the landed interest be arrested in its onward course; and I feel assured this can only be effected by a fearless and unflinching determination on the part of every individual, who has the slightest interest in British land, to support only, at the next elections, those candidates who will voluntarily and unreservedly pledge themselves to uphold a fair protection to British industry, in a British House of Commons.

I am, Mr. Editor, one of those who, abhorring treachery and tergiversation, would—not in words only, but in truth and sincerity—

"LIVE AND LET LIVE."

Glamorganshire, 11th August, 1846.

—Cardiff and Merthyr Guardian.

NORTON FARMERS' CLUB.

The monthly meeting of the members was held in their room, at the Bagshawe Arms, on Monday, August 10th; the Rev. H. H. Pearson, vicar of Norton, in the chair. Mr. Hodgkinson, of Hazlehurst, and Mr. Charles Speight, of Millhouses, corn miller, were elected members of the Club.

The Machine and Implement Company.—A considerable part of the evening was occupied with remarks on the Machine and Implement Committee's report and rules, which were confirmed by the proprietors. W. J. Bagshawe, Esq., was elected president; T. B. Holy, Esq., treasurer; and Mr. William Wright, secretary to the Company. In addition to many other costly articles useful in agriculture, one of Hornsby's eleven coulter drilling machines, of the value of £43, was ordered to be purchased. This machine won the first prize at the recent Royal Agricultural exhibition, and its capabilities are everywhere highly spoken of. The depôt for the implements will be at Norton Hall, where suitable premises are being provided, and a labourer appointed to take them in charge.

Ribbing Wheat.—Mr. LITTLEWOOD, of Moortop, said he quite concurred with every endeavour to promote agricultural improvements by the introduction of superior implements, but since he had adopted, with success, a cheap and simple implement for depositing seed, he would, with the permission of the members, explain his method of ribbing wheat. After a few other prefatory remarks, Mr. Littlewood proceeded as follows: — I have adopted the system for the last two years on a part of my farm, and it has been attended with considerable success. It is a new plan in this part of the country; but I do not lay claim to it as being a discovery of my own. The plan of performing the work is to first plough the land in an ordinary way, and then to plough a strong furrow, and not, as a great deal of land is ploughed, only to the depth of three to four inches. If the land is grass or clover ley, do not plough it less than five or six inches, since there will then be plenty of soil for the ribbing. The plough is made of iron, and the one I use was manufactured on my own premises, and is of a smaller size than the common ploughs, having about five inches at the heel. After the land is ploughed as I have stated to a good depth, it is then harrowed down and the ribbing commenced with; only one horse being required. The proper way is to work two yokings or flats at the same time, beginning at the inside of the ground and going up at the backside of each furrow, which leaves the land in seams or ridges. I then sow the land broadcast, and harrow it to cover the seed. A pair of light harrows are the most suitable to follow. The land being thus ribbed causes the seed to be mostly deposited at one depth and well covered, which is not the case with corn sown broadcast in the usual way, which is invariably deposited at very irregular depths, some of it being too deep, which never vegetates, and a deal not covered at all. We are all aware that the whole of the seed sown never grows, or we should get heavier crops than we do at present. I would not confine the system to grass land only, for I think it is quite as applicable to fallow, or any description of ground. At the same time attention should be paid not to forget to plough the land to a good depth. After the land is drawn out for sowing, the latter can be done almost at any time. For spring corn the plan answers equally as well as for autumn sowing. There is also a great probability of clover and small seeds growing much better than when sown broadcast; and I must admit that I prefer ribbing to drilling. By being ribbed it allows more room for the corn to grow, and the plants grow about three inches apart, which distance with ordinary care, allows ample room for being hoed; while drilled corn which comes up in a narrow seam is too much crowded, and if on a strong ground a great deal is never covered at all. By ribbing, the corn being deposited at a proper and a good depth, the straw is also much stronger, and not liable to break down. Mr. Littlewood concluded his remarks by a brief allusion to the great evil of too many furrows in land, and unnecessary hedgerows; and he also said that many were in the habit of wasting ground in the middle of fields by making the lands too narrow, causing a very great loss in unnecessary furrows, which mostly produced very little corn, and that of an inferior description. On strong soils he would not make the lands less than six or seven yards in width, particularly where it is on the descent; and on dry land fourteen yards are quite enough. By following his suggestion, many farmers in that neighbourhood would only have one furrow where they now had two. Mr. Littlewood, in answer to an inquiry, admitted that he had not tried the drilling machine himself, but he had found from experience that much good had resulted from what he now recommended to others, and he should be happy to answer any questions that might be put to him in reference thereto.

Mr. W. WRIGHT said, it was generally recommended to sow the seed immediately after ploughing; but according to a remark made by Mr. Littlewood it appeared as if that were of little consequence.

Mr. J. LISTER thought a few days' delay of no moment.

Mr. LITTLEWOOD said he had grown eleven loads to the acre last year on the plan he recommended; and if the season had not been so unfavourable, he had no doubt the yield would have been larger by twelve or fourteen bushels. Another great advantage was connected with his system—it saved a considerable quantity of seed. He thought, however, that too much spring seed could not be sown.

Mr. GREEN began to doubt the prevalent opinion respecting thin sowing of Michaelmas seed. He named a farmer in the neighbourhood who always sowed more than his neighbours, and his crops seldom failed. He was aware that it was a saying, that if wheat was "winter proud" it was "summer poor." But notwithstanding this, it now appeared to him that those who sowed the greatest quantity of seed had the best crops.

Mr. WRIGHT thought Mr. Littlewood was quite correct in his recommendation of deep ploughing.

After a few other remarks, the CHAIRMAN proposed a vote of thanks to Mr. Littlewood for his paper, and the discussion ended.

The Disease in Potatoes.—The Rev. CHAIRMAN regretted to added his testimony to that of others respecting the probable failure in the potato crops both in this neighbournood and in Ireland, from which latter country he had recently returned, and where he had been sojourning for some time. The disease in his own crop was quite apparent; and while in Ireland he had not seen one good or sound potato.

Mr. WRIGHT said, the potatoes in the grounds at Norton Hall, which a few days since were excellent in appearance and quality, were now in a rapid state of decomposition from disease. He had heard of many other crops in the neighbourhood that were also more or less affected.

Ploughing Match.—It was resolved to hold another ploughing match connected with the Club, to take place at the latter end of September or beginning of October, and a committee of management was appointed. The members then separated.

THE GAME LAWS.

PARLIAMENTARY PAPER.

The Select Committee appointed to inquire into the operation of the game laws, and to report their observations and opinions thereon to the house, and who were empowered to report the minutes of evidence taken before them, have considered the subject referred to them, and have agreed to several resolutions, which they beg leave to report to the house, together with the minutes of evidence taken before them.

1. Resolved, That it is the opinion of this committee, that the common law of England has always distinctly recognized a qualified right of property in game; and that, from a very early period, it has been found necessary, by statutory enactment, to make some special provision against the attempt to steal or destroy a species of property peculiarly exposed to depredation.

2. Resolved, That it is the opinion of this committee. that the stringency of the game laws has been from time to time materially qualified and relaxed.

3. Resolved, That it is the opinion of this committee, that the recent act, 1 and 2 William IV., cap. 32, vested the property in game in the occupier of the soil, and distinctly recognized in game, as the subject of sale, one of the essential qualities of private property.

4. Resolved, That under these circumstances, the tenant has at all times the power to secure the game to himself, or to reject the tenancy, if the proprietor of the lands insists on a reservation being made of the game in his (the proprietor's) favour.

5. Resolved, That it is the opinion of this committee, that to exclude game from the protection of the law would be inconsistent with a due regard to the security of other property.

6. Resolved, that it is the opinion of this committee, that the taking of game by persons who have no right of property in it should continue to be the subject of penal legislation.

7. Resolved, That in reviewing the statutes now in force with reference to the pursuit and sale of game, it appears to your committee that alterations may be suggested which, without impairing their efficiency for the repression of crime, would prevent the unequal or excessive punishment of persons who violate their provisions.

8. Resolved, That it is expedient to abolish cumulative penalties for poaching.

9. Resolved, That your committee are not, however, prepared to recommend such an alteration of the law as would exempt from more severe penalties those who, in the illegal pursuit of game, commit at the same time a breach of the revenue laws, or those who in the day-time, being armed, and in numbers, are guilty of violence.

10. Resolved, That it is the opinion of this committee, that the penalty imposed by the statute 52 George III., cap. 43, for sporting without a certificate, appears excessive.

11. Resolved, That it is the opinion of this committee, that the space of three days allowed by section 44 of 1 and 2 William IV., cap. 32, for giving notice of appeal against any summary conviction under this act, should be extended.

12. Resolved, That it is the opinion of this committee that it is expedient that so much of 5 and 6 William IV., cap. 20, which allows a moiety of the penalty levied under 1 and 2 William IV., cap. 52, to go to the informer, should be repealed.

13. Resolved, That is the opinion of this committee that no person convicted of night poaching, under sec. 1, 9 George IV., cap. 69, whose offence is unattended by circumstances of aggravation, should be subjected to the punishment of transportation.

14. Resolved, That it is the opinion of this committee that no person convicted of night poaching, under the first section of 9 George IV., cap. 69, should be required to find sureties for not repeating such offence.

15. Resolved, That it is the opinion of this committee, that, apart from considerations of revenue, every owner or occupier of land having the right to kill the game on that land, should have such right without being required to take out a game certificate.

16. Resolved, That your committee further recommend the abolition of certificates as regards the pursuit and destruction of hares by means of packs of hounds, or by greyhounds; and also to recommend the reduction of the duties on greyhounds to those imposed on common dogs.

17. Resolved, That your committee regret to find that great facilities still exist for the disposal of stolen game.

18. Resolved, That it has been suggested to your committee, that by imposing additional legislative restrictions upon the sale of game, such facilities might be diminished, if not altogether removed; but the practical difficulty of enforcing any such regulations appears to your committee to be almost insurmountable, and the regulations themselves would necessarily be of so stringent and vexatious a character that your committee cannot recommend their adoption.

19. Resolved, That it is the opinion of this committee, that the powers of constables should be better defined and enlarged, in regard to the search and detention of persons found under suspicious circumstances with game in their possession; and that power should be given to constables to search public-houses and beer-shops (licensed to sell off as well as on the premises) for game, it having been proved before the committee that they are extensive receptacles for stolen game.

20. Resolved, That it is the opinion of this committee, that the present time fixed for the period at which feathered game becomes a marketable article, and saleable by the dealer, should be postponed; and they re-

commend that the sale of each species of game should be deferred until one day after the season for shooting it has commenced.

21. Resolved, That your committee has received evidence to show that the preservation of large quantities of game has been the frequent cause of damage to the neighbouring crops.

22. Resolved, That it is the opinion of this committee that in cases where the damage done to the growing crops of the occupier is caused by game belonging to or reserved by the owner of the land, such damage may be made the subject of pecuniary compensation.

23. Resolved, That it is the opinion of this committee that although instances to the contrary have been proved to your committee, evidence has been adduced before them which warrants the conclusion that, in general, a tenant's just claim for compensation is complied with by his landlord.

24. Resolved, That it is the opinion of this committee, that great difficulty must always exist in determining the amount of damage which has been inflicted by game on growing crops, and that the estimate of such damage, however skillfuly made, is rarely satisfactory to both parties.

25. Resolved, That it is the opinion of this committee, that where, from the vicinity of the preserves of adjoining proprietors, such damage must be attributed to the game bred and preserved therein, the reparation for such damage cannot generally be made the subject of previous agreement.

26. Resolved, That it is the opinion of this committee, that under these circumstances, cases of hardship may be expected to recur; but the extreme difficulty of establishing the liability of any particular party for the damage done, or correctly assessing the amount of such damage, have induced your committee to reject the suggestion that an action on the case would be a fitting or practical remedy for damage done to growing crops by game.

27. Resolved, That it is the opinion of this committee, that this species of damage is to be attributed mainly, if not entirely, to hares and rabbits, and that no appreciable proportion of such damage can be ascribed to feathered game.

28. Resolved, That it is the opinion of this committee, that the law in Scotland with regard to game differs from that in England in many essential particulars, and but little evidence respecting that part of the subject has been adduced before your committee.

July 6.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

The following communications, addressed to the Secretary, were received at the Society's office too late last week to be laid before the Council, and included in the report of its proceedings.

POTATO DISEASE.

"West Alvington, Kingsbridge,
"Devon, Aug. 4, 1846.

"Mr. W. H. Balkwill, chemist, &c., of Kingsbridge, having made some careful observations, and, as I believe, valuable discoveries, on the subject of the potato disease, I have requested him to draw up a statement of his experience in that matter, which you will receive herewith, and which I request you to lay before those members who may be present at the next meeting. Mr. Balkwill has devoted much time to the subject, and I feel convinced that his statements are every way worthy of credit.

(Signed) "DOUGLAS MACDONALD."

"Kingsbridge, Aug. 4, 1846.

"You will probably receive a note in a day or two from the Rev. Douglas Macdonald, respecting the fact to which I beg to call your attention; and that is, that the potato disease is spreading in this locality more if possible than last year; and as I imagine that I have beyond a doubt discovered the origin of it, I am desirous of putting you in possession of the facts, which I will do in as concise a form as possible. I planted some perfect seed in my garden, that had lain in the ground all the winter, and a potato, I believe, was never planted there before, so I determined to watch for any symptom of disease. I observed the stalk first eaten a little in the top, and soon after a number of green bugs, as large or nearly as a common house-fly, made their appearance. A few days after, I noticed the disease in that part where I observed the bugs; and after getting one or two stalks much diseased, it seemed to spread very rapidly. I then saw one of the insects void a greenish fluid; and I took a perfectly healthy leaf, and smeared this over it. In twelve hours, it was spotted in many places; and in twenty-four hours, the spots were nearly as large as peas; and in double that time, a mass of disease. I then practised the same experiment on a growing healthy stalk, and one apart from the disease. In a few days it was perfectly withered, and rotten. I then mounted on horseback, and rode many miles into the country, and in every instance for many miles I found the insect wherever the disease appeared; but amongst perfectly healthy ones, there was not the vestige of one to be seen. I shall be most happy to afford all the information in my power on this most serious calamity; but from my experience, it appears to me quite evident that the disease is contagious; and that one or two stalks, and as many insects, are sufficient to infest an entire field. The insect leaves the plant as soon as it becomes diseased, which will account in a measure for its not being discovered before. If you wish, I will procure the insect, and send it you. I had many confined, but they are all dead.

(Signed) "WM. H. BALKWILL, Chemist."

REVIEWS.

COATES'S HERD BOOK; containing the Pedigrees of Improved Short-Horned Cattle, vol. 6.

By H. Strafford.

London: J. Rogerson, Norfolk-street, 1846.

To the breeder of short-horns this work is indispensable. Mr. Strafford has proved himself fully competent to the task of carrying out what was so ably begun by the late Mr. Geo. Coates. This volume is carefully digested: the alphabetical arrangement simplifies the reference to any animal, and its extensive index of animals' names, as well as their breeders, makes it perfect as a "Herd Book," by its ready assistance to the reader in tracing the pedigree of any animal.

Coates's Herd Book, now extending to six volumes, is a complete standard work. Experience proves that in the breeding of short-horned cattle, as well as race-horses, nothing is so material and indispensable as blood: hence it follows that those who wonld wish to improve their stock should not be without this work as a book of reference when they will be enabled to derive such general information as is therein contained.

It is illustrated with engravings of the most celebrated animals.

On the Influence of a Scrofulous or Scorbutic State of System in producing certain morbid Secretions; and showing the True Nature of their Diseased Action is "IRRITATIVE," not "INFLAMMATORY."

By George Franks, Surgeon.

Published by the Author, 90, Blackfriars'-road, London.

The work now before us will be appreciated by the professional man, who is aware of the importance of distinguishing between "irritative" and "inflammatory" action in determining the course of treatment of disease. The author is of opinion that the symptoms of the former are frequently mistaken for the latter, sometimes even by experienced practitioners. When such is the case, it is scarcely necessary to remark that the consequences must, through mistaken treatment, be injurious to the patient, and ultimately prejudicial to the practitioner himself. Mr. Franks does not content himself with asserting the fact, but proceeds to show, by argument and demonstration, which appear to us conclusive, that the position he assumes is correct. He also refers to a variety of cases, and quotes the opinions of eminent professional men upon particular points, which corroborate and confirm his views. The point on which writers upon professional or scientific subjects fail in rendering a work useful to the general reader is in the use of terms which are almost, if not altogether, unintelligible to the *un*professional man. Mr. Franks has been eminently successful in avoiding this defect, and has produced a treatise perfectly readable and intelligible to the plainest comprehension.

We are aware that doubts are entertained of the propriety of *un*professional persons consulting medical books; and, indeed, some persons assert that evil consequences may result from so doing. We do not recommend the perusal of such works to enable the reader to doctor himself. But if we had not previously entertained the opinion, this work would have convinced us of the advantage, nay, we would almost say the necessity, of every man informing himself generally of the fact that certain symptoms are not always characteristic of positive disease; that, for instance, gout, rheumatism, affection of the kidneys, stone, scrofula, scurvy, and even "disturbance of the digestive organs is capable of producing diseased action," which no person, who was not informed of that fact, could possibly imagine. Having carefully perused Mr. Franks's book, we can state with confidence, that it ought to be perused by every man, inasmuch as the information it contains may not only afford relief to the mind upon the appearance of symptoms which are not really indicative of the disease supposed, but may be the means of guarding the patient against the practices of the unskilful and the empyric.

TESTIMONIAL TO THE DUKE OF RICHMOND.—We have much pleasure in copying the following paragraph from the *Sussex Express*:—"Preliminary proceedings are now taking place for the purpose of carrying forward the design of presenting to the Duke of Richmond a testimonial, for his services in the cause of the British agriculturist. The proceedings will in a few weeks be completed, and we have no doubt that such an amount of subscription will be collected as to confirm us in the opinion we have before expressed, that the farmers are neither ungrateful to, nor unmindful of, the services which His Grace has rendered to their cause. In fact, at the opening of the present session of Parliament, we were waited upon by several leading men of this county, to call public attention to the propriety of carrying out their views upon this subject; but at our suggestion, the design was deferred to the present very proper period. Such a feeling, originating with the agriculturists, is truly honourable and deserving of record."

METEOROLOGICAL DIARY.

Barometer.			Thermometer.			Wind and State.		Atmosphere.		
Day.	8 a.m.	10p.m.	Min.	Max.	10p.m.	Direction.	Force.	8 a.m.	2 p. m.	10 p. m.
	in. cts.	in. cts.								
July 22	29.90	29.98	58	75	59	West	lively	fine	sun	fine
23	29.97	29.90	56	76	60	W. by South	lively	fine	sun	fine
24	29.88	29.90	55	67	55	W. by South	gentle	cloudy	cloudy	cloudy
25	30.00	30.09	48	72	53	West	lively	fine	sun	fine
26	30.16	30.22	47	76	58	West	variable	fine	sun	fine
27	30.20	30.22	57	75	65	W., W. by N.	lively	cloudy	cloudy	cloudy
28	30.27	30.20	62	81	65	Every way	calm	cloudy	sun	fine
29	30.17	30.07	59	85	66	E., E. by S.	lively	fine	sun	fine
30	30.05	30.05	62	83	69	N. East	brisk	fine	sun	fine
31	30.07	29.97	65	85	69	E. N. East	brisk	fine	sun	fine
August 1	29.88	29.80	64	86	64	Every way	variable	fine	cloudy	fine
2	29.80	29.87	58	74	59	Westerly	gentle	haze	sun	fine
3	29.88	29.95	56	72	59	N. E., S. W.	gentle	cloudy	cloudy	cloudy
4	29.99	29.99	51	76	60	Westerly	gentle	cloudy	sun	fine
5	30.00	29.95	55	75	67	S. E., N. E.	brisk	cloudy	cloudy	fine
6	29.93	29.90	62	81	66	N. East	lively	fine	sun	cloudy
7	29.84	29.77	64	81	65	N. W., West	calm	cloudy	cloudy	cloudy
8	29.77	29.80	61	74	59	W. S. West	variable	cloudy	cloudy	fine
9	29.89	30.00	57	73	60	W. S. West	gentle	cloudy	fine	fine
10	30.04	30.05	57	73	58	S. West	lively	cloudy	cloudy	cloudy
11	30.08	30.10	55	72	60	W. by South	gentle	cloudy	sun	cloudy
12	30.10	30.09	57	74	59	W. by North	gentle	cloudy	sun	fine
13	29.91	29.80	51	65	53	South	brisk	cloudy	cloudy	fine
14	29.84	29.86	46	68	56	N., S. W., E.	variable	fine	sun	fine
15	29.80	29.77	52	76	56	S. West	gentle	fine	cloudy	fine
16	29.80	29.89	49	72	56	N. West	gentle	fine	sun	fine
17	29.89	29.78	55	70	56	S. East	lively	fine	cloudy	cloudy
18	29.65	29.57	55	68	55	South	lively	cloudy	cloudy	cloudy
19	29.70	29.80	54	67	60	N. West	gentle	fine	sun	fine
20	29.86	29.76	54	63	58	S. West	gentle	cloudy	cloudy	cloudy

ESTIMATED AVERAGES OF AUGUST.

Barometer.		Thermometer.		
High.	Low.	High.	Low.	Mean.
30.260	29.350	82	41	61.5

REAL AVERAGE TEMPERATURE OF THE PERIOD.

High.	Low.	Mean.
77.83	56	66.96

WEATHER AND PHENOMENA.

July 22, Very fine; airy; calm at night. 23, Most beautiful till evening; then streaky black clouds form. 24, Much fine rain; red sunset. 25, Two showers; otherwise fine. 26, Very fine. 27, Cloudy; lively air; changeable: the days have of late been windy; calm succeeding at or before sunset. 28, Close; but the three following days, though hot, rendered cheerful by air, which, however, was electrical on the 31st, when there was lightning—the precursor of the storms of August.

LUNATIONS.—New moon, 23rd, 8 h. 3 m. morning; first quarter, 31st day, 11 h. 3 m. morning.

August 1, Highly electric, heavy, varying clouds; thunder and sharp rain for three hours; hail. 2, Fine rain till noon. 3, Rainy morning; two thunder showers; heavy rain. 4, A little small rain early. 5, Thunder at intervals from six A. M. till noon; red suffused sunset. 6, Oppressive and damp; hazy clouds after sunset. 7, The same; heavy clouds, and one roll of thunder; profuse rain; and also on the 8th. 9, Finer, with sunny gleams. 10, Dull; small rain in the evening. 11, Drying, and improved. 12, Soaking rain in the night; fine warm day. 13, Same. 14, Very beautiful. 15, Changeable; rain at noon. 16, Fine gleams; sober, tranquil day. 17, Lively air; fine morning only. 18, Much rain. 19, Drying air; fine sun; evening changeable. 20, Overcast, followed by drenching rain. This period has been generally windy, and in it there were *thirteen days with rain.*

LUNATIONS.—Full moon, 7th day, 6 h. morning; last quarter, 13th, 10 h. 51 m. afternoon.

REMARKS REFERRING TO AGRICULTURE.

The extreme and dry heat brought the corn forward rapidly, insomuch that the wheat was nearly harvested with us before the end of July, in the finest condition; though some find fault with quantity. The oats are very short, miserable-looking things; droughted, half-grown, irregular: the barley better; but, like all 'checked' vegetation, it is debilitated. The rains have been superfluous for both. Clovers yield well a second time; but turnips are wretched—the beetle *(haltica)* having been merciless in its ravages. As the north wind has now continued two days, we hope a real and permanent melioration. JOHN TOWERS.

Maidenhead Thicket.

CALENDAR OF HORTICULTURE.—SEPTEMBER.

RETROSPECT.—Subsequent to the period when our last was closed, July became very fine, with a maximum many degrees, upon the average, above summer heat (76°), with two days, 24th and 25th, of very acceptable rain. Till then our land was scarcely moistened; but after the lightning on the 31st the heavy thunder storms broke up the weather, and on this 18th day, inclusive, we count 12 days that have been rainy. Thus garden-ground is soaked; and as the temperature is warm, vegetation progresses with rapid strides.

Fruits are few: the apples good, but far under an average: pears scarcely any, unless we consider such the few dozens of fruit which set from the second crop of blossoms, weeks after the first bloom had fallen off abortive. These little pears—"untimely fruit"—grow upon very long spur-like, unnatural stalks, at their summits, projecting right forward, and in no degree pendulous; their ripening would be a phenomenon. Plums there are none, or next to none; so that the numerous wasps drag on a miserable existence, starving as to fruit, save the few peaches and nectarines thus early ripe, which are drilled with holes even before they have taste or odour. The numerous broods devoured all the remaining gooseberries, leaving a vain mockery of hulls upon the trees; so early, beyond precedent, had the solsticial-like summer called them into life. Thus, in many respects, the year and its phenomena have been peculiar; and though the splendour was striking, it cannot be remembered with a feeling of satisfaction.

One crop is remarkable and beautiful: the *grapes* on the wall tend to rival those of a late vinery; even the black *frontignac* has set its berries, now swelling for colour (the seeds formed) as well as under glass. We never saw a *wall*-crop so elegant; but the weather becomes unpropitious—wet and boisterous.

What can be said of the *potatoes*? Attacked they are, and since the month of August came in. So far as home experience goes, the haulm is as yet the chief seat of the disease, which does not advance so rapidly as in 1845. Some tubers were a little spotted before any disease appeared above ground, but, in nine cases of ten, we perceive the affection of the leaves, while the stem and tubers remain sound. Mildew surrounds the black spots, and this, viewed under a powerful lens, is seen to be hygrometic, the plants whirling with a rotatory movement when the breath of the observer reaches them. The changes that a few hours produce in this Protean malady permit no prognostic; and as to prevention or cure, man is powerless. The atmosphere, or its peculiar meteorological condition, is not much under control; and we are better prepared to admit such influence, than to attach any credit to the reported attacks of insects, or to the influence of soil and manures.

VEGETABLE GARDEN.

Mushrooms.—Nature produces these abundantly at this season in meadows, if the weather be moist: to obtain the best, artificially, choose the German mushroom-house, with a small water-pipe running round it at bottom, furnished with shelves and compartments to receive horse droppings in deep layer, and a few inches of pure yellow loam, beaten till firm, upon that.

Sow occasionally *salads, lettuces,* as the hardy green cos, and brown Dutch or Bath, in a frame, leaving it open till frost occur. Late in the month some may be transplanted upon ridges of earth, like a celery ridge; such plants stand the winter well, as the plants are always drained.

Cauliflower and *cabbage* seedlings ought to be pricked out; the former three or four together in rich ground, to be covered with hand glasses; the latter six or eight inches asunder, to obtain stocky growth. Young colewort cabbage of July ought also to be planted out for greens.

Celery.—Any that is well grown may be earthed up, just so high as to reach, but not to suffer the earth to go among, the centre leaves.

Some peas of July, if not mildewed, are likely to be fine and seasonable now; they may bear into

October, and so may kidney beans of both kinds. When gathered, no time should be lost before the haulm be removed and the ground trenched and laid up in ridges.

Onions, gather the silver-skinned or pickling, and the large Spanish or other store kinds for roping. Dry them well in an open airy shed.

Hoe the *Winter Spinach,* and use some of the plants, pulling them up in thinning order, so as to bring them, at this season, to 3 inches apart.

Vegetable Marrow ought to be cut regularly, and then the fruit will swell, so long as the weather shall remain sunny and mild.

Cucumbers must be cut for girkins, and finally the haulm removed to the compost heaps; then the land, being rich in dung, should be ridged, and in so doing, thoroughly mixed. Let no weeds predominate—

"One year's seeding
Makes seven years' weeding."

Watch the digged *potatoes*: they may be a good, but small crop after all: but green well all intended for seed, and store the others dry and cool as possible.

FRUIT DEPARTMENT.

Peaches. — We suspect that the few melting peaches left by frosts in March will have vanished: they ripened very early, and the wasps and earwigs were exceedingly busy. The clingstones, or Michaelmas peaches, remain; and these should be attended to by training in the young wood, exposing the fruit to the sun, but guarding it by open muslin covers, if large flies, &c., be still active, as they were throughout August. We are told that, as to snails and molusca, a strong wash of sulphate of copper (*bluestone*) brushed on the wall, below and round the limits of the branches, will effectually prohibit their advances.

Grapes will ripen early, and, if no unforeseen adverse circumstances occur, nearly rival those of the vinery; the clusters should speedily be enclosed by crape or gauze bags. Sugar or treacle-and-water, in bottles, entices and destroys thousands of flies.

Gather and store such apples and pears as may be ripe; and cut back the extending shoots that are intended to form spurs in the wall and espalier trees.

Strawberries.—This is a most favourable season to form new beds. The soil ought to be fresh as possible, trenched and manured two feet—at all events, eighteen inches. When settled (and not later than the 15th day), the best young runner-plants of the first growth from the mother plant should be raised, with all the earth that can adhere, and be set by the line twelve or fifteen inches asunder; or, better still, young plants rooted in small pots in July, set with entire balls, would be certain. Beds of three rows, eighteen inches asunder, are preferable to border rows, because the runners, in the latter case, encroach upon box-edgings and gravel walks. An open, sunny side is best for early *Keen's* and the *British Queen.* Pines may have two situations—one sunny, the other with a north or eastern aspect. The Elton is one of the latest, and will, by aspects, be made to bear through July to August. Alpines prosper in the shade.

Of *forced fruits*, the *melons,* if sun abound, will require air, and may furnish some fine late fruit.

Pines grow wonderfully at this time; and strong suckers now taken, or if left on the old stool, ought, with vigilant care, to become fruit-bearers in one year or fifteen months. By the old method—a very good one to have a complete house of fruiters—the largest plants should now be brought into the fruiting house, plunged to the rims in a bed of very moderate heat, be dressed at top with an inch or two of the best, decayed turfy soil, and, after two or three days' inclosure, receive plenty of air during every sunny day till three or four o'clock; after that hour, a mere dewing with a very fine syringe comprises all the watering the plants receive till about Christmas. Thus is established what is termed "drying them off."

The *latest vinery* ought to have its fruit ripe, and dry air should be copiously given while sun is in the house. The genuine West's St. Peter's is the best late purple grape; its skin is too tender for carriage; its juice delicious, with few pips in the pulp; we kept it till January last season. The largest berry, and perhaps the best setter of the kind, is the cannon-ball muscat. Fires, if required to obviate damp, ought always to be lighted early in the mornings of dry weather, bringing the flue or pipes to active heat, in order to allow of a free current of air to carry off moisture. The house, otherwise, when the fruit is ripe, cannot be too cool.

FLOWER GARDEN.

Collect seeds of annuals, and do this in detail as the seed-vessels ripen: store them when quite dry; and brown papers, marked with the name of each, is the best material for packages. Seeds dropped in the ground from the plant frequently produce the strongest plants; but these must be restricted to perfectly hardy plants, unless a quantity be speedily potted.

Raise all the small geraniums intended to be kept, pot them immediately, and keep them in close frames until they be firmly rooted.

Let the *greenhouse* be timely cleaned and whited, then return its plants to it, having previously washed every pot. Let all the *succulents* be dressed at top with sandy loam and a pint of bone-dust;

press the earth firm, but give little or no water. The hair-rooted, hard-wooded tribes must have all the air at *all* times which circumstances permit.

Roses in pots should be cleaned, and pruned to figure, taking away the dead and ill-placed twigs, then be placed in a dry, airy pit.

Plant the *pinks* raised by pipings, if well rooted, and those of the layered carnations; choose a sandy soil, with some sifted lime, rubbish, and decayed cow-dung, as compost to cover the roots.

Pot off rooted verbenas and similar ornamental plants, to be preserved under glass.

Almost any shrub or tree can be safely removed at the end of the month; for these, therefore, large holes, far wider than the space occupied by the roots or ball of earth, ought to be got ready.

All the *American tribes* may be moved, and complete plantations formed, without applying bog or peat solely to them. Good loam and leaf mould, thoroughly worked to a full spade depth, and a little of the best heath-soil deposited in each hole intended for a plant, are sufficient. Heath or bog is too poor of itself, though it is useful for the plants to lay hold of at first, and also a subsequent top-dress, but a considerable portion of loam is the staple.

Attend to all the routine of order, and, among other operations, clip hawthorn hedges, and preserve the best figure and regularity possible.

The weather becomes more rainy, and is now superfluous.

August 20.

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR AUGUST.

Notwithstanding the weather of the past month has been somewhat variable, very considerable progress has been made in harvest operations, not only in the forward districts, but also in those north of the Humber. Generally speaking, the wheats have been secured in excellent condition; and it affords us great pleasure in being enabled to state that the aggregate produce of that description of grain is likely to prove an average one. In some of the western counties nearly the whole of the wheat has been stacked; but some time must yet elapse ere the fields will be cleared in the north. Still, however, we may state that the harvest has proved an early one. The long-continued drought experienced in the early part of the season has had an unfavourable influence upon the barley, which, in some localities, will prove a very short crop; and, taking that for the whole country, it is very evident it will not be equal to that of last year. The same cause has unquestionably operated against the oat, bean, and pea crops, which, in some quarters, are smaller than we have known them for some considerable period.

The violent storms of hail experienced shortly after the beginning of the month beat down and destroyed large breadths of corn; but it is gratifying to observe that those atmospheric casualties were by no means general, although, of course, great damage was done to the produce of the soil whilst they were at their height.

From most parts of England we have been favoured with reports respecting the available supplies of old wheat in the hands of the farmers. As might be expected, from the moderate quantity produced last year, they are by no means large for the season; and a few weeks longer will nearly, or quite, exhaust the remaining stocks.

The statements which have come to hand respecting the potato crop are, we regret to state, of the most unfavourable character. Scarcely a district or locality in any part of the United Kingdom—England and Ireland in particular—appears to have escaped the long-complained-of disease, the result of which must prove most disastrous in its effects not only to the growers but the consumers. Various are the remedies proposed to check its progress; yet we know of no more simple one, and which we know has been attended with great success, than that either of brushing or pulling off the diseased haulm (in which, as it appears to us, the disease first commences), and allowing the potatoes to remain in the ground until ripe. In France, Belgium, and most other parts of the Continent, the disease appears to be spreading as rapidly as with us; hence it is very possible that an increased demand for bread-stuffs will spring up—and which, indeed, has already commenced, so far as France is concerned—during the next month or six weeks, and relieve us of a large portion of the late importations, which are, we find, somewhat improving in value.

The crop of grass-seeds this season is likely to be a fair average one, both as respects quality and quantity.

We regret to observe that this year's supply of nearly every description of fruit—apples in particular—is very small; hence the growers in Kent and elsewhere are demanding and obtaining very high rates, compared with those of many preceding years; and it is placed beyond a doubt that a very small quantity of cyder will be produced in the large districts.

Owing to much of the farmers' time having been engaged in the fields in superintending harvest work, very moderate supplies of English wheat—a large portion of which has been of the present year's growth, and of very excellent quality—have appeared on sale in the metropolitan as well as the large provincial markets. The unfavourable reports respecting the potatoes, and the short stocks of wheat held by the millers, have produced a very steady demand for this article, and the quotations have advanced from 3s. to 6s. per qr. Scarcely any new barley has appeared on show: grinding parcels have moved off steadily; other kinds slowly, at late rates. Notwithstanding the large influx of foreign oats, the trade, arising from the above-mentioned causes, has been active, at a rise in value of from 1s. to 2s. per qr. Both beans and peas have commanded a steady inquiry at somewhat enhanced prices. We have heard of 58s. per qr. having been paid in Mark Lane for one or two cotchels of new peas.

The rains experienced in the early part of the month having produced a large quantity of pasture herbage, many graziers have kept back a portion of their stock, previously destined for the various markets, in order to feed off the pastures. Still, however, the supplies forwarded have been seasonably extensive, though a slight falling off has been apparent in the quality of the beasts. In nearly all parts of the country sheep are still commanding a very high rate of value; but beasts, lambs, calves, and pigs are by no means dear.

Our advices from Scotland state that much rain has fallen there; consequently the cutting of most grain has proceeded slowly. New wheat and oats have been on sale in the Edinburgh and Glasgow markets, and which have produced fair prices. In old qualities rather more business has been doing, and the quotations have had an upward tendency.

The accounts respecting the general yield of wheat from Ireland are satisfactory; but as relates to that of other grain, we are informed that it will be deficient. The corn and provision trade has ruled very steady, and higher prices have been obtained by the holders.

NORTH NORTHUMBERLAND.

July has, as usual, proved a wet month, but the rains have not been too great, and not accompanied by cold; indeed, we never remember a month of more growing weather. The result has been a very great improvement in the crops of corn, and a most luxuriant growth of turnips; we have not seen so rapid an advance for many years. The fearful storms, that have devastated some parts of the country, we have escaped, and now require only a few weeks of dry airy weather to gather in the harvest, which is almost universally within a few days of ripening. Wheat is certainly not a full crop, but clean in the straw, and will, if we have a dry week or two, be got in in good order, and prove a good sample. Barley has increased much in bulk, but is not more than an ordinary crop. Oats on free loams are good; on all other descriptions of soil decidedly thin. In North Durham and South Northumberland all the wheat is ripe, but very little cut, owing to a great scarcity of work-people. Mowing will be very generally resorted to. The hay crop has proved a light one on new lands, but the reverse on good old lea. Much is still standing in that disgraceful and slovenly manner peculiar to this far-famed and enlightened county; the frequent rains and heavy fogs of course rendered all the outsides of little value, yet all will be put indiscriminately into the rick, and then great surprise will be manifested that horses dislike the offered food, and, when eating it, do not thrive. Now I am sorry to revert to a theme of great moment and sad prospect—I allude to the potato crop. In running over the county lately, I was delighted with the beautiful and healthy appearance of the crop. Those sweltering hot days occurred, succeeded by long-continuing and dense fog. Again I had to traverse the county, and lo! when all that but a few days before cheered the spirits and charmed the eye, had been changed as by magic. The mysterious influence had breathed upon the smiling fields, and a sudden and irrevocable doom had been pronounced—everywhere the blackened stems spoke of desolation and decay. Fearful is the prospect for the suffering poor over the length and breadth of the land. The crop appears to be going fast to destruction, and thankful indeed may every one be that the prices of grain promise to be within the reach of the toiling labourers. The disease I conceive to have been produced by the same cause as last year, only unfortunately at an earlier period, namely, the intense heat, succeeded by too much moisture. By lifting the roots now, all those not yet tainted may be preserved. Let us hope that timely attention may in some degree avert the frightful consequences of a total loss of this most necessary article of food.—August.—Kelso Chronicle.

SOMERSET AND WEST OF DORSET.

1st of 8th month.—In the early districts, and round Taunton, a good portion of the wheat has been secured very dry, and in grinding condition; but on the 31st ult., between three and four o'clock, there was a very heavy thunderstorm, with a good deal of rain later in the evening, and again this morning. This must have taken parties very unprepared, and the wet must have gone some way into the open stacks, and it will probably soon grow out. In Dorset the crop of wheat is spoken of as very good in every respect; much better than last year in this county, from its being laid, &c. There are many exceptions, however; and lately, those who had previously thought well of their produce per acre have altered their opinion; and I am disposed to think there is more exception to a good kerning than before harvest commenced was calculated upon. Peas are about half a crop, and the quality bad. Barley quite an average, but late. Oats are also an average, but lately there is some complaint of blight. Winter beans are an extraordinary crop, and mostly well harvest; the spring-sown ones are nearly an average, but much blighted lately. Flaxseed are likely to be very abundant and well secured. Vetches are said to be very productive, and red clover never promised better. Potatoes are found more or less in a diseased state all over the county, and its progress is very rapid from week to week: the consequence will, to all appearance, therefore, be much more serious than last year.

8th Month, 3rd.—Our harvest prospects have changed for the worse. The rains of yesterday and to-day have caused the wheat to grow in the stacks to a serious extent, with a probability of a further increase, from the present state of the weather.—Dorset Chronicle.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

One of the most important features connected with the cattle trade in the past month may be considered the importation of live stock for our principal markets. As this is a subject of the most vital importance to our readers, we herewith direct their particular attention to the following observations. The fact of great steadiness, coupled with somewhat improved currencies, having been experienced in the metropolitan markets during the past month, have been exultingly pointed at by the supporters of the new tariff as a sure indication that the foreign importations cannot have any material influence upon the value of home-fed stock. But what, we ask, is the cause of this comparative improvement? Every one practically acquainted with the subject is aware that, at this particular period of the year, very limited quantities of slaughtered meat, owing to the heat of the weather, are forwarded to London from Scotland, or any part of England; the consequence is, that we are almost entirely dependent upon the live supplies disposed of in Smithfield. Sheep, it is true, are selling at a very high range, as much as 4s. 8d. having been paid for prime old Downs; but we cannot admit that the value of any other kind of stock is high; and we are quite of opinion that, so soon as the cold weather sets in, the quotations will have a downward tendency.

Since the beginning of the year to the 5th of July, in 1844, 1845, and 1846, the annexed imports took place into London and at the outports:—

	1844.	1845.	1846.
Oxen........	602	3,566	3,921
Cows.........	318	1,667	5,546
Calves	37	102	404
Sheep	103	1,271	14,225
Lambs	7	33	1,095
Pigs	114	260	309
Total......	1,181	6,899	25,500

What more striking fact could we adduce of the correctness of the views we have all along entertained as to the ability of the foreign graziers to supply us with increased supplies of stock? Every effort is now being made by them, by securing our best breeds, to improve the quality of their beasts and sheep; and we have no hesitation in saying that, in the course of another year, they will be able to command our markets with all kinds of stock, and thereby inflict a most severe blow upon the essential interests of the grazing community.

The past month's imports have been as under:

	Beasts.	Sheep.	Lambs.	Calves.	Pigs.
London ..	1625	7976	780	219	..
Hull......	500	800	200	80	60
Plymouth .	92	..	..	..	..
Total....	2217	8776	980	299	60

At the corresponding period in 1845 they were as follow:—

	Beasts.	Sheep.	Lambs.	Calves.
London	715	1183	140	111
Hull.........	466	300	..	..
Glasgow	75	..	..	..
Southampton	30	..	..	..
Total	1286	1483	140	111

Thus it will be perceived that, in spite of the sage predictions of the enemies of agriculture, the arrivals are increasing to an alarming extent. It is necessary to state that the epidemic is committing most serious ravages in nearly or quite the whole of our flock districts. The foreign sheep and beasts, although we are informed that the utmost care is evinced by the customs' authorities to prevent the importation of diseased cattle, have come to hand in very bad condition, scarcely any of the sheep being free from foot-rot.

The various markets have been tolerably well, but not to say heavily, supplied with stock, arising from the superabundance of pasture herbage. Generally speaking, the demand has ruled steady, at very full prices.

Smithfield has exhibited an increased number of foreign beasts and sheep; but a portion of them has been grazed—to some advantage, we presume, notwithstanding their voracious appetites—in the marshes in the neighbourhood of London. Prime beasts have advanced a trifle, while mutton has risen quite 2d. per 8lbs. In all other kinds of stock only a limited business has been transacted.

The supplies have been as under :—

	Head.
Beasts	16,974
Cows	535
Sheep and lambs	178,790
Calves	2,567
Pigs	1,845

The following were the returns for the corresponding periods in 1845 and 1844 :—

	August, 1844.	August, 1845.
Beasts	12,010	16,228
Cows	620	525
Sheep and lambs	195,412	151,330
Calves	1,290	2,205
Pigs	1,462	2,511

The comparison of prices rules thus :—

	Aug., 1846.		Aug., 1845.		Aug., 1844.	
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Beef, from	2 8	to 4 0	2 8	to 4 2	2 4	to 4 0
Mutton	3 0	4 8	3 4	5 0	2 6	4 0
Lamb	4 4	5 6	4 8	5 8	3 8	4 8
Veal	3 6	4 6	3 8	4 8	3 4	4 6
Pork	3 6	4 10	3 2	4 4	3 2	4 0

Since our last the bullock supplies have been derived from the following districts :—

	Head.
Northern counties	4000
Norfolk, Suffolk, &c.	2250
Western and Midland	2000
Other parts of England	1500
Scotland	282
Ireland	300

The remainder of the supplies have been derived from abroad and the neighbourhood of London.

Newgate and Leadenhall markets have been scantily supplied with country-killed meat, but the quantities on offer slaughtered in London have been large. On the whole, the trade has ruled steady, at full prices.

ARRIVAL OF CARCASSES DURING THE MONTH.

	Beasts.	Sheep.	Calves.	Pigs.
Scotland	5	—	—	—
Yorkshire	28	30	—	100
Lincolnshire	55	155	—	70
Norfolk	30	130	—	60
Suffolk	5	119	—	20
Essex	20	60	140	120
Cambridgeshire	58	90	—	60
Surrey	70	140	90	100
Devonshire	—	—	—	30
Wiltshire	65	150	50	60
Other parts	45	200	50	70

THE LATE HAILSTORMS.

The destruction amongst the crops, glass, and garden productions by hail during the late storms is not calculable; but in many cases we know the effects to have been ruinous to the sufferers, which they, by the practice of a little providence at the proper time, might have averted. Insurance against hail appears to us to be as essential for the security of the agriculturist as is insurance against fire. And although the numbers which have hitherto insured against hail have been comparatively as nothing when compared with all that have suffered, yet the following list of names of parties who have already been reimbursed for their hail losses by the ROYAL, FARMERS' AND GENERAL, FIRE, LIFE, AND HAIL INSURANCE INSTITUTION speaks powerfully of the benefit which the agricultural public, &c., may derive by supporting the principle of hail insurance :—

Mr. W. Hailes, Babraham; Mr. R. D. Piper, Little Abingdon; Mr. T. Webb, Hildersham; Mr. W. Claydon, Linton; Mr. W. Chalk, Linton; Mr. W. Clark, Linton; Mr. T. W. Lyles, Great Chesterford; Mr. A. Cotton, Hildersham Hall; Mr. J. Baker, Minsfolly; Mr. J. Stephenson, Benwick; Mr. W. Gilbey, Melbourne; Mr. J. Johnson, Beddingfield; Mr. J. Hunt, Heydon; Mr. J. T. Lyles, Heydon; Mr. J. Prime, Langley; Mr. J. Prime, Clavering; Mr. T. Baker, Great Cheshill; Mr. J. Surridge, Inworth Hall; Mr. S. Josling, Ashley Hall; Mr. T. Hare, Mashbury Hall; Mr. W. Rolfe, Milsdon; Mr. J. Pearson, Hampstead; Mr. C. Browne, Hampstead; Mr. S. Walby, Bailey; Mr. W. Dark, Foulsham; Mr. J. Bird, Elmham; Mr. J. B. Rush, Wymondham; Mr. C. W. Harvey, Ashwellthorpe; Mr. R. H. Baker, Acle; Mr. W. Oliver, Spilsby; Mr. J. W. Bourne, Mavis Enderby; Mr. C. Smith, Friskney; Mr. W. Fletcher, Raithby Fen; Mr. J. Harbage, Fenny Compton; Mr. T. May, Oddington; Mr. G. Bartlett's Executors, Thatcham; Mr. W. Cave, Thatcham; Mr. T. Tomlins, Midgham; Mr. C. Hazell, Midgham; Mr. A. Coles, Snelsmore; Mr. J. Pocock, Chieveley; Mr. J. B. Pocock, Leckhampstead; Mr. J. Westbury, Boxford; Mr. E. Tull, Peasmore; Mr. J. F. Collins, Betterton; Rev. W. Hayward, Charlton House; Mr. W. Clarke's Executors, Lockings; Mr. J. Terreman, Great Coxwell; Mr. F. Bernard, Wantage; Mr. W. Dixon, Wantage; Mr. J. Dixon, Wantage; Mr. U. Hunt, West Challow; Mr. J. Godfrey, Ash.

AGRICULTURAL INTELLIGENCE, FAIRS, &c.

THETFORD LAMB FAIR was a very good one, being exceedingly well attended by both buyers and sellers, and a large amount of business transacted. The supply of lambs was short, and sold readily at prices varying from 14s. to 24s. and 26s. each. Crones from 18s. to 22s. Stock ewes were in good demand. Fat sheep at 7s. to 7s. 6d. per stone. There was a very good show of beasts, which found ready purchasers. Amongst them were a lot of superior working beasts shown by Mr. Gayford, which sold at 16*l*. to 17*l*. each; also a lot of excellent Devons shown by Mr. Jolly went readily at 10*l*. to 12*l*. each. Shorthorns, by the same, realized fair prices; and Scotch, which sold at proportionate prices. On the whole there was a much readier demand for beasts than for several years past, and we are glad to find that this fair increases yearly in importance.

LOCKERBY LAMB FAIR, Aug. 13.—In 1845 the numbers shown were calculated at 45,000; they may be set down this year at fully 50,000 head. Half-breds of the first class were in good demand, and sold generally at from 20s. to 23s. each, waiving entirely the clad score; second class do., from 17s. to 18s., or 18s. 9d., the last a very common price; and third class do., from 16s. to 14s. In small lambs of either class less money was occasionally given, and we are aware of a few instances in which 12s. 9d. and 13s. was pretty nearly the price stipulated. The best Cheviots brought readily from 12s. to 14s. 6d., and seconds from 10s. to 12s. In a few cases less money may have been offered and accepted; but not generally, from the circumstance that the small or mid lambs are by most storemasters kept over till the September fair. The advance in this department was generally reported at from 6d. to 1s.; but we are aware of cases in which 1s. 6d. per head was given above the highest currencies of last year. In half-breds the advance was estimated in the morning at from 9d. to 1s. Of black-faced there were only twelve goodly lots, and a thirteenth small one selected by some jobber, and sold retail to such housewives as grudge the price of dye, and are fond of knitting the gudeman's stockings. The best description of black-faced brought 8s. 6d., the second 6s. 6d., and the worst somewhere about 5s. 6d. There was a large lot, however, of brockles, a cross between Leicester tups and Highland ewes, which brought the handsome price of 17s. each. A few wool-staplers attended the market, and did a little business at the following prices:—Cheviot wool at from 20s. to 24s.; and laid, at from 23s. to 25s. per stone of 24lbs. Laid wool from 12s. to 13s. 6d. According to some reports pure Cheviot hog wool has been sold as high as 27s. per stone; and even the mixed kinds, including half-bred of the first quality, at 26s. per stone.

SHENNAS SHEEP AND LAMB FAIR.—This fair took place on Wednesday last. There were upwards of 100 scores of sheep and lambs shown. Two-year-old wedders ranged from 16s. to 14s. per head; summer yield ewes from 14s. to 12s. per head; and black-faced wedder lambs from 8*l*. 10s. to 7*l*. 10s. per score, according to quality. There were some sales of stock ewes to be delivered in September at fully last year's prices. A number of cattle was also on the ground, but we heard of few sales. On the whole it has been a good market for sheep and lambs; and we think the stock shown would all change hands at the above quotations.

CARMARTHEN FAIR.—At none of the fairs that have recently taken place has the price of horses been so extremely high as at our fair held on Wednesday. It was impossible to get any kind of a horse fit for the most ordinary work at less than from 20*l*. to 30*l*., and even much higher. The prices demanded in the first instance were so much above what has been recently attained, that the drovers, of whom a great many attended, turned away without offering any sum, but were eventually obliged to come to, and a great many animals, some very superior ones, exchanged hands. Young colts also fetched a high figure, and numbers were disposed of; it is not often so many horses of all descriptions have been offered for sale at an August fair. The show of good cattle was above an average one, and the demand brisk, at remunerating prices. At the pig fair held on Thursday, the show of pigs was not so good, but were nearly all disposed of at a very fair rate, 4½d. per lb. being what was generally obtained.—*Carmarthen Journ.*

TAVISTOCK FAIR.—The quantity was fully equal to former August fairs, and the condition was generally good. The large attendance of dealers caused a brisk inquiry, and very high prices were asked in the morning; prices, however, receded a little about 10 o'clock, and considerable business was done at remunerating rates. Fat sheep and lambs were in brisk demand, and the whole were quickly sold. Fat cows fetched from 52s. to 57s.; ditto steers, 42s. to 45s. per cwt.; sheep, 5¼d. to 6d.; lamb, 6d. to 6½d. per lb. On the whole it was pronounced a large and selling fair.

ASHBOURN FAIR.—There was a considerable show of stock of all kinds, though from the abundance of keep throughout the country, the supply was not so extensive as on former years. Buyers were numerous, and sales brisk, at an advance upon the prices obtained at the last fair. Good horses were scarce.

SAXMUNDHAM SHEEP AND LAMB FAIR was exceedingly well attended by all the principal agriculturists and dealers in the county, and also several dealers from Essex, and a large amount of business was transacted. There were nearly 10,000 sheep and lambs penned, and were most of them sold at the following prices:—Pure Down lambs varied from 15s. to 24s. each; half-bred Down and Leicester from 18s. to 22s. each; good black-faced ewe-lambs were much in demand, and sold readily at 24s. and 26s. 6d. per head. Shearling stock ewes were inquired after, and fetched from 36s. to 38s. each; crones, from 18s. to 22s.; fat sheep, 7s. and 7s. 6d. per stone.—*Suffolk Chronicle.*

ST. JAMES'-DAY FAIR.—PAISLEY.—There was a fair stock of good milch cows shown, and for which from 12*l*. to 14*l*. were readily obtained. Those which were inferior or aged sold at from 9*l*. to 12*l*., a few even under these prices. There were several dealers from the east country; and the attendance of buyers, considering that this is their busy season, was pretty numerous. A few black cattle were on the ground, but the dulness which visited Falkirk on the previous day seemed to have reached there, no one asking their price. There seemed to be a considerable traffic in pigs, but we could not ascertain anything like a ruling rate for these animals. Of horses a good many were shown, and several sales effected. Good draught horses brought from 35*l*. to 45*l*., inferior, from 25*l*. to 30*l*. Riding and harness horses, of which a few were shown, were not inquired after.—*Glasgow Citizen.*

REVIEW OF THE CORN TRADE

DURING THE MONTH OF AUGUST.

When we last addressed our readers, harvest had just commenced in the southern parts of the kingdom, and there was then every appearance of the crops being favourably secured. This expectation was partially realized, a considerable proportion of the corn grown to the south of the river Humber having been well got in previous to the breaking up of the fine weather. Considerable damage was, nevertheless, done by the tremendous storm which visited all the southern parts of the kingdom on the 1st of August, and the two or three subsequent days. A large quantity of grain was then still abroad, even in the home counties; and no time having been allowed for thatching the newly formed stacks, the deluge of rain which fell penetrated these to some depth, to the manifest injury of the grain; still, as a whole, the wheat was well saved, and is of excellent quality, in all the forward districts. It was at first thought that the yield to the acre would also prove satisfactory; but in proportion as thrashing has been proceeded with, it has been discovered that the estimate in this respect has been much too favourable; and there is reason to think that, even in those localities where there is no fault to be found with the quality of the new produce, the quantity falls materially short of expectation. This discovery would, perhaps, alone have sufficed to check the downward movement of prices; indeed, holders had already begun to show symptoms of unwillingness to sell at the rates current in the early part of the month. Their firmness was subsequently increased by the broken weather which succeeded, and the consequent fears entertained respecting the harvest in the north. It is true that the weather has at no period of the month been decidedly unfavourable, at the same time it has been sufficiently unsettled to give rise to apprehension. At this moment, there is still a large proportion of the wheat crop abroad in the north of England, Scotland, and Ireland; and it is undeniable that the quality has suffered. Repeated heavy showers, with a close, hot temperature, have been the leading characteristics of the weather of late; and under the combined influence of heat and moisture, the grain, whether standing, or in sheaf, or still uncut, has been in imminent danger of sprouting. Nothing can be more detrimental to the mealing properties, weight, &c., of wheat, than its growing in the ear; and it is much to be feared that this defect will be very general in much of that not early harvested.

The greatest cause of alarm has, however, still to be named; we mean the disease which has again attacked the potato this season. Even as early as July there were indications of the disorder; but of these no particular notice was taken at the time, and we were in hopes that the apprehended mischief would prove comparatively trifling. Lately, however, the complaints have become so universal, that it would be folly to endeavour to underrate the extent of the calamity. The murrain is evidently spreading in all directions, and threatens to be far more serious in its consequences than it was last year. The breadth of land under this crop was then great: this season it is, on the contrary, much less than usual; the doubts very reasonably entertained at the time of planting, as to whether it were safer to devote much land to the growth of an article which had proved so unfavourable the year before, having had the effect of causing many to refrain from trying the experiment. Independent of the falling off in produce on this account, the return would probably have been short, as the weather was too dry in May and June to suit the plant. It is, therefore, pretty certain that, had there been no repetition of the disorder of last year, the crop of potatoes would still have been deficient. The ravages made by the disease are, therefore, the more alarming; and there can be no doubt that the value of all other articles of food will be materially affected by the failure of this, the poor man's crop. Various substitutes will have to be employed, the most important of which will, no doubt, be flour among those classes who are in a situation to command this comparatively costly article, and Indian corn and oatmeal among the poorer members of society. The extra consumption of flour will, in all probability, be immense; and it is consequently pretty certain that wheat will bear a much higher value than was at one period considered likely to be the case. The price has already risen 5s. to 7s. per qr. from the lowest point of depression, and the tendency is still upwards in all parts of the kingdom.

It is a singular fact, that millers are nearly as bare of stocks as they were previous to the liberation of the foreign wheat and flour in June. So long as there appeared a prospect of prices declining, the manufacturers of flour were satisfied to buy from hand to mouth; and the late rise has been so sudden, that they had no time to place themselves in a position to profit by the circumstance. They are now evidently anxious to retrieve their error, but at the same time unwilling to buy largely after so important a rise. Meanwhile farmers and merchants appear more inclined to hold than to press their property on the market, and unless it should be discovered that the potato disease has been exaggerated (of which we think there is little probability), prices of wheat must inevitably go higher.

Public attention has been so engrossed, of late, with an endeavour to ascertain the probable result of the wheat harvest, and the extent of the potato failure, that all other matters have, for a time, been lost sight of. It has, therefore, been extremely difficult to obtain accurate information respecting the yield or quality of the crops of spring corn; but, from all we have been enabled to learn, we are disposed to believe that our opinion, as expressed last month, will be found not far from the truth; viz., that barley and oats will be short of an usual average produce, and beans and peas more defective than has been the case for many seasons past. Under these circumstances there is no one article of food of which there is a surplus production, to make good the deficiency caused by the potato rot; for though we are still inclined to think that wheat (notwithstanding the complaints of short yield from the straw) will prove a good crop, it will certainly not exceed an average.

At Mark Lane a good deal of excitement has prevailed; business remained quiet enough till the 10th inst., but since that day prices have risen rapidly. No quantity of new wheat of consequence was brought forward till the 3rd of August, when samples representing 600 to 700 qrs. were exhibited on the Essex and Kent stands. The quality was universally approved of, and the millers showed considerable anxiety to secure a portion of the new, the whole was therefore soon cleared off; the finest parcels of red brought 48s. to 50s., and choice white 56s. to 58s. per qr., being several shillings per qr. more than could have been made for the best old wheat. On the following Monday the bulk of the supply consisted of new, and the reports of the yield having by that time become more unfavourable than they had previously been, factors insisted on an advance of 2s. per qr. without in the least checking the demand, the stands being speedily cleared at the enhancement. Old wheat also rose 1s. to 2s. per qr., and was in improved request. During the subsequent week the anxiety to get into stock increased, and each succeeding market day the value of wheat rose, until the 24th, when fair runs of new red reached 54s. to 55s., and prime parcels of white 60s. to 62s. per qr.

In the early part of the month Foreign free wheat was almost entirely neglected, and at one period moderately good qualities of Danzig were sold, duty paid, at 48s. to 50s. per qr., and other sorts were freely offered at corresponding rates. Things remained in this position till about the middle of the month, when the increasingly unfavourable reports respecting potatoes from all parts of the kingdom caused a sudden change. The town millers, who had till then acted on the reserve, began to purchase more freely; and a country demand springing up at the same time, holders deemed it expedient to raise their pretensions. The upward movement in prices commenced on the 17th, and on the 24th the best Lower Baltic red, and superior qualities of Danzig wheat, were held at prices 5s. to 6s. per qr. higher than they had been offered at a fortnight before. So important an advance has, it may easily be conceived, induced caution on the part of buyers; still the transactions have been on a more extensive scale this than the preceding month. The stocks of free wheat in warehouse have rapidly diminished of late; and as the duty is now at the maximum point, the arrivals from abroad are likely to be stored in bond. Wheat under lock has met with a fair share of attention, partly on speculation, and partly for export to France and Belgium, in which countries the harvest has proved so unsatisfactory as to lead to the inference that they will have to import largely. Good red wheat has lately brought 44s. to 45s., and Danzig 47s. to 48s. per qr. in bond, being more than the same varieties would bring free, with addition of the present duty.

The town millers made a great mistake in reducing the top price of flour to 43s. per sack on the 10th of August. No sooner had this been done than prices of wheat took such a start as to put the manufacturers at a disadvantage; the bakers were not slow to perceive this, and bought freely at the reduced terms, until the millers declined entering into further contracts except at enhanced rates; and on the 24th they agreed to put up the price 3s. per sack. Ship flour was very pressingly offered in the beginning of the month; Norfolk households, and similar qualities, were at one time sold at the low price of 32s. per sack; since then, however, the rise has been as rapid in the value of this article as in that of wheat, and good marks have risen to 36s. per sack. The case has been precisely similar in respect to foreign flour. At one period there were no buyers and all sellers, and fine brands of United States were sold at 25s. per brl. duty paid; this, however, did not last long; the price was too tempting, and the quality too much liked by our bakers, to allow of the article being long neglected, and a rise of 3s. to 4s. per brl. has since taken place.

Scarcely any new barley appeared at market until the 24th instant, and then only a few small parcels. We are therefore hardly yet in a position to say much about the quality of the new produce. By far the greater part hitherto exhibited has consisted of thin and otherwise inferior; but this has not been the case universally, two or three small lots grown in Kent having appeared of very choice quality. These were eagerly taken by the maltsters, at high rates; and in one instance as much as 40s. per qr. was realized, whilst good lots sold at 36s. to 38s. per qr. The transactions in old barley have been on a restricted scale throughout the month. The value of the article has, nevertheless, crept up, and heavy sweet grinding sorts have recently commanded 28s. to 29s. per qr. The arrivals of this grain from abroad have been mostly warehoused in bond, in the expectation of a lower duty.

Malt has met a moderate degree of attention; and the rise in prices of barley has, as usual, had its influence, good season-old parcels of malt having advanced 1s. to 2s. per qr. within the last week or two. There is again a lull in the agitation for obtaining a remission or total repeal of the malt tax, which we hope, however, may prove but temporary.

That the stocks of old oats are reduced into a very narrow compass all over England and Scotland does not admit of doubt; and though we cannot speak so positively in regard to Ireland, still it is the general belief that the quantity of last year's growth remaining in the United Kingdom is unimportant. The arrivals of this grain into London from our own coast and Scotland have for some months past been trifling; and latterly the Irish supply has also fallen off: it is therefore certain that the market would long ere now have become exceedingly bare, but for the receipts of foreign corn. The inferior quality of the bulk of the oats received from abroad, and the very bad condition in which most of the cargoes have come to hand, rendered importers very anxious to effect sales from on board ship; and so great was the pressure in the beginning of the month, that light Dutch feed were parted with at 18s. 6d., yellow Danish weighing 39 lbs. to 40 lbs. per bushel at 21s., and archangels at the same rate. No sooner, however, did the belief become general that the produce of potatoes would prove unusually small, and the consumption of oatmeal large in proportion, than the confidence of sellers returned, and in the space of a fortnight prices rallied 2s. 6d. to 3s. per qr. Though the supplies from abroad have, as before remarked, been rather extensive during the month, the stocks have not accumulated, and most of the principal dealers are very poorly provided with oats. As regards the arrivals from abroad, no great quantity can in the first instance be expected, except what is now on passage from Russia; and should our Irish neighbours withhold supplies (which, if what they say respecting potatoes be true, they are sure to do), the value of oats is likely to go much higher during the next month or two.

The generally acknowledged failure of the bean crop has failed hitherto to cause any speculative inquiry for the article; and as the consumptive demand is trifling at this season of the year, the operations have been on rather a restricted scale during the month. The few parcels of new exhibited at Mark Lane have proved of fine quality; ticks have sold at 35s. to 37s., and a parcel of very handsome pigeon beans brought 45s. per qr. Floating cargoes of Egyptian beans have been much inquired for of late, and 28s. to 30s. per qr., cost and freight, has been freely paid for parcels on passage.

Peas have been in steady request throughout the month, and the supply has scarcely kept pace with the demand. New white boilers have brought 44s. to 45s., and even as much as 50s. per qr., and Maples 36s. to 38s. per qr., being a material rise on the rates current towards the close of July.

At Liverpool a good deal of business has been done in Indian corn, large purchases having been made there for Irish account; in consequence of which the value of the article has advanced some 4s. to 5s. at that port. At Mark Lane the inquiry has also improved, but not to the same extent; and it has been difficult to induce buyers to pay more than 30s. to 32s. for yellow, or 32s. to 34s. per qr. for white.

Our notice of the grain trade abroad will be found to be of less interest than usual this month. In the northern ports of Europe scarcely any business has been done, except of a local character; the depressed state of the trade in the British markets until quite recently having put a stop to shipments to England. Even after the advance which has lately taken place with us, wheat is still comparatively cheaper in this country than abroad; and as the stocks of old are pretty nearly exhausted at the principal Baltic ports, there is no prospect of much being done for export until supplies of the new crop shall have been brought forward freely.

In this state of affairs our remaining space will, perhaps, be employed most profitably in laying before our readers all the information we have hitherto been enabled to gather relative to the probable result of the harvest in those countries from which we are most likely to receive supplies.

From Russia, Poland, and Prussia, the accounts do not speak very favourably of the wheat crop; still, we are inclined to think that neither the yield nor quality of the new produce will turn out bad in any of those countries which send supplies down to Danzig and Konigsberg; and we feel tolerably certain that shipments on rather an extensive scale will be made from these ports in autumn and spring, if our prices should be at all encouraging. In Silesia, Pomerania, and the Ukermark districts (where, it will be recollected, the harvest proved more favourable last year than in any of the neighbouring countries), the produce is reported to be inferior, in every respect, to that of 1845. In Holstein and the Danish islands a good crop of wheat has been secured; but spring corn has, as with us, suffered from the drought during the summer. In Holland the wheat has yielded tolerably well; but rye has fallen miserably short, which is also the case in the Rhenish provinces. From Belgium the reports are unfavourable generally; and it is more likely that our Dutch and Belgian neighbours will require foreign aid, than that they will have grain to export. We shall now turn our attention to the more southern parts of Europe. In France the corn crops are said to be very deficient as a whole: in some departments of the kingdom there may be a surplus, but in others the deficiency is reported to be serious. Rather considerable shipments of wheat have been made of late from London to Marseilles, Rouen, &c.; and it is not improbable that France may take a further quantity, if our prices do not advance too high. The summer in Italy has been so extremely hot as to do great injury to vegetation; and the yield of wheat, Indian corn, &c., has proved unusually small in consequence; there is no prospect, therefore, of exports from thence to Great Britain. Any surplus which there may be at Odessa is likely to be wanted in the Mediterranean; and, without the value of wheat should rise considerably in this country, and the duty be reduced to the minimum point, England need not calculate on supplies from the eastward of the Straits of Gibraltar.

The most recently received advices from North America confirm what we had previously learnt from that quarter relative to the harvest. Wheat has produced well all over the United States, and in both Upper and Lower Canada; besides which, good stocks of last year's crops appear to have remained over; and, important as have been the arrivals in England from the other side of the Atlantic, further considerable supplies may be looked for. On the 1st August Flour was still obtainable at New York at about 18s., and at Montreal at 21s. per brl.

CURRENCY PER IMPERIAL MEASURE.

Wheat, Essex and Kent, new, red	50	55	White ... 50	56	58
Old, red	48	52	Do	52	54
Rye, old	34	—	New	56	38
Barley, Grinding 27 28 Malting	30	32	Chevalier	34	—
Irish	22	24	Bere	22	24
Malt, Suffolk and Norfolk	58	63	Brown	56	60
Kingston and Ware	60	—	Chevalier	65	—
Oats, Yorksh. & Lincolnsh., feed	24	25	Potato	26	28
Youghall and Cork, black	22	23	Cork, white	24	25
Dublin	23	24	Westport	26	27
Waterford, white 20	22	23	Black	22	23
Newry	26	27	Galway	20	21
Scotch, feed	25	26	Potato	28	30
Clonmel	24	25	Limerick	27	28
Londonderry	26	—	Sligo	26	27
Beans, Tick, new	34	37	Old, small	40	42
Peas, Grey	34	37	Maple	35	37
White	36	41	Boilers	42	44
Flour, Town-made	45	47	Suffolk 38	—	per sack of 280 lbs.
Stockton and Norfolk	38	—	Irish 41	—	

FOREIGN.

Wheat, Dantzic	46	50	Fine	50	56
Hamburg	44	48	Rostock	46	48
Barley	24	—			
Oats, Brew	25	—	Feed	21	—
Beans	32	—	Peas	32	—
Flour, American, per brl.	25	—	Baltic	—	—

IMPERIAL AVERAGES.

Week ending	Wheat.		Barley.		Oats.		Rye.		Beans.		Peas.	
July 11th	52	3	27	7	24	3	33	11	37	11	35	3
18th	50	10	27	10	23	0	36	5	38	4	36	4
25th	49	11	27	2	29	5	29	9	38	0	36	10
August 1st	47	5	26	11	23	5	28	2	39	3	35	11
8th	45	2	26	9	24	0	29	8	39	8	35	3
15th	45	1	27	3	23	3	30	7	39	6	36	0
Aggregate average of the six weeks which regulates the duty.	48	6	27	3	23	7	31	5	38	11	35	11
Duties payable in London till Wednesday next inclusive, and at the Outports till the arrival of the mail of that day from London	9	0	4	0	1	6	4	0	4	0	4	0
Do. on grain from British possessions out of Europe	1	0	1	0	1	0	1	0	1	0	1	0

COMPARATIVE PRICES OF GRAIN.

WEEKLY AVERAGES by the Imp. Quarter, from the Gazette, of Friday last, August 21st, 1846.			AVERAGES from the corresponding Gazette in the last year, Friday, August 22nd, 1845.		
	s.	d.		s.	d.
Wheat	45	1	Wheat	57	0
Barley	27	3	Barley	29	4
Oats	23	3	Oats	22	2
Rye	30	7	Rye	34	4
Beans	39	6	Beans	41	2
Peas	36	0	Peas	39	7

PRICES OF SEEDS.

Rapeseed, 21*l*. 23*l*. Irish, —*l*. —*l*.
Linseed, Baltic, 40 44 Odessa, 45 46
Mustard, per bush., white 10 12 brown, — –
Linseed Cakes, English 10*l*. 10*l*. 10s. per 1000
Linseed, English, sowing 50 60 crushing 43 45 per cwt.
Carraway, 41 43 new, 42 44 Coriander, 10 13
Hempseed, 35 38 per qr. Trefoil, 20 21
Canary, 47 48 fine, 50 52 Tares, winter, 6s. 6d. 7s.

HOP MARKETS.

BOROUGH, MONDAY, Aug. 24.

Reports from every part of the Hop-growing countries, from day to day, assume a more favourable aspect. Where the bur appeared unusually slight, the Hops have filled and grown out to an extent quite unexpected. No one is now against the duty being 180,000*l*. Picking will be general in about a week. Some will commence earlier. The market is stagnant.

FARNHAM, August 21.—Should the weather prove favourable, hop-picking will commence on Monday next in some of the most forward plantations around this place. Several growers, we are told, anticipate a crop of twenty to twenty-five cwt. per acre. At Hale, near Farnham, the hops are generally very good. At Crondall they are not so tall on the poles, which is accounted for by the land not being so rich nor of so deep a soil as about Farnham; but still many plantations look exceedingly promising compared with their appearance in the early part of July last. At Bentley the hops look exceedingly well, if we except two or three spots or gardens; such till recently were condemned as not likely to be worth picking, yet now are very much altered for the better. At Froyle, Sir Thomas Miller has some excellent plantations of hops, expected to yield double the quantity produced from the same number of acres last year; picking is expected to begin next Monday. At Wennell, near Alton, there are some very fine plantations only waiting for fine weather to enable the pickers to begin work. The duty is laid at Farnham, and also at Alton, from 160,000*l.* to 170,000*l.*, and the produce around is expected to exceed that of the famed year 1836.

MAIDSTONE, August 20.—Since our last report, with the exception of a stiff breeze on Tuesday night, the weather has continued very favourable, and the hops are still going on most prosperously. In many of the healthy grounds, where the vermin obtained but slight hold, there is a fair prospect of an abundant produce. Fifteen to twenty cwt., and even exceeding a ton per acre, are talked of in some instances. We hear of very few further complaints of the mould, but the flea is continuing its destructive ravages in many parts of the diseased districts, and in such cases picking must not be long delayed. Some will commence early in next week, and it will become pretty general by the end of the month. The duty here is backed freely at from 165,000*l.* to 170,000*l.*, and some dashing betters go even beyond the higher amount—upon what grounds we cannot say. There is no doubt the mould is very general, and how far the close, muggy nights with the wet weather will retard or increase its progress, has yet to be settled.

WOOL MARKETS.

BRITISH.

LEEDS, Aug. 21.—Sales of combing wools have been rather quieter this week, but prices are firm at late quotations. The demand for low and middle qualities of short wools continues good, and prices are fully maintained. The finer qualities of clothing wools are flatter than the lower kinds.

WAKEFIELD, Aug. 21.—A better feeling generally pervades holders of wool; but, so far, the late events favourable to the trade have not led to any extensive dealings. Prices may be quoted firm, but not higher.

YORK, Aug. 20.—We have had a moderate show of wool at this day's market, and very few buyers were present. The day being unfavourable, caused a dull sale, and many lots were left unsold. In price there is little or no alteration.

HULL, Aug. 18.—There was not so much business transacted to-day as at the last market, in consequence of the short supply of wool, the farmers being chiefly engaged in the harvest fields. Prices were rather lower, being from 26s. to 27s. per tod. The whole of the stock shown was disposed of, but several good lots were left on hand, in consequence of the absence of the owners. The next being the last market, it is anticipated that there will be a greater supply, including some very superior lots.

LIVERPOOL, Aug. 22.

Scotch.—The demand for laid Highland wool continues to be limited at barely our quotations. There is rather more doing in white Highland. In crossed and Cheviots the transactions have been on a small scale, at about our quotations.

		s.	d.		s.	d.
Laid Highland Wool, per 24lbs	....	7	9	to	8	3
White Highland	do	11	0		11	9
Laid Crossed	do.. unwashed....	9	6		11	0
Do.	do..washed	9	9		12	0
Do. Cheviot	do. unwashed	10	0		12	6
Do.	do..washed	12	0		15	6
White Do.	do................	21	0		24	6

Foreign.—There has been a fair amount of business done this week in low wool; the importers seem inclined to meet the markets, and late rates are barely maintained.

FOREIGN.

The following, from America, shows again, what we have so often noted, the progress of manufactures there:

"There is very little doing in this or any other market at the North and East. It is said that the tariff bill affects the market, and keeps it in an unsettled state. This may be, but generally there is very little doing at this season of the year.

"We learn from our private letters that Lowell is in a very flourishing condition. It appears that notwithstanding the proposed reduction of the tariff, new mills are going up in all parts of the city. It is supposed that the woollen interest will suffer most from any reduction in the rate of duty. One of our letters states that a new canal has been commenced, which is to cost 300,000 or 400,000 dollars. It is under contract, or a portion of it is, to several New Yorkers.

"The flourishing village of Cohoes is growing at a most rapid rate. Over 100 buildings are in course of erection there. Among them a large cotton factory, belonging to the Ogden company, which will run 8,000 spindles."

There is a little more demand now than there was on the sailing of the last steamer. The fall business seems to be somewhat anticipated. The new tariff does not go into effect till the 1st of next December; but it is not supposed that at this day the manufacturers will be seriously, if at all, affected by its provisions. Apart from the "experiment of things," the *ad valorem* principle is the only really serious objection to the bill.

The *Waterloo Observer* says, that among the improvements which are now being made in that village, the new woollen factory just erected is entitled to a conspicuous place. As an elegant building it is an ornament to the village. The main part is four stories high, besides the basement; 156 feet long, and 47 in width. It is built of limestone, which abounds in that vicinity; and most of the machinery has been made in that village. The building is designed for fourteen sets of machinery, but at present contains seven. Connected with the factory is a new dry-house, 100 by 500 feet, and a dye-house 77 by 50, built of the same material as the factory. The amount of wool now used is about 1,200lbs. per day, which will be considerably increased, and it is probable that 500,000lbs. will be annually manufactured. About 180 persons are now employed in the establishment, which number will be considerably increased.

Accounts of the 12th of this month, from Breslau (Germany), state that the demand for lamb's wool continued, although not quite so active. There was not a great deal doing in single clip Wool. The supply in the market was 17,000 cwt.

From Riga, under date of August 10, we are informed that the Wool fair was over. There were 49,000 poods offered, but business was not quite so good as had been anticipated; fine quality was at 22 to 25, and mid. at 16 to 19 roubles, 5 per cent. discount.

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THE FARMER'S MAGAZINE.

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PLATE I.

GALLOWAY BULL.

The subject of our first plate is a Galloway Bull, four years and six months old, bred by Mr. Grierson, Bishopton, the property of his Grace the Duke of Buccleugh, which obtained the first prize of Thirty Sovereigns as the best Bull of the Galloway breed, at the Highland Society's Meeting, held at Dumfries, October, 1845. The exhibition of Galloway cattle at this show, from the district in which it was held, was considered one of the most prominent features. His Grace also obtained the first prize for the best Cow of that breed, besides other premiums.

PLATE II.

PYRRHUS THE FIRST; Winner of the Derby, 1846.

Pyrrhus the First, a chesnut colt, was bred by his present trainer, Mr. John Day, in 1843, and was got by Epirus, out of Fortress by Defence, her dam Jewess by Moses, out of Calendulæ by Camerton—Snowdrop, by Highland Fling.

Fortress, bred by Mr. Tattersall in 1836, and own sister to Martello, never appeared in public, but has already made ample amends as a brood mare for any want on active service, as witness already, after only having been five years in the stud, the following, amongst her produce: Delapre, a very decent runner; Old England, who ought to have won the Derby last year; and Pyrrhus, who did win it this. Fortress consequently now ranks as one of the picked racers of England, and that means of the world.

Epirus, own brother to Elis and Stockport, and as fine a horse to the eye as ever was trained, was bred by Mr. Bowes in 1834, and got by Langar, out of Olympia by Sir Oliver, her dam Scotilla by Anvil, out of Scota by Eclipse—Herod, &c. As a race-horse Epirus was considered a right good one, running well and on, and always, moreover, in the best of company. As a stallion he promises to be even more valuable, considering Pyrrhus the First is the first of his stock out.

The plentiful allowance of stout blood thus flowing through the veins of the last Epsom wonder, we leave to the study of all sticklers for pedigree, while we add on Mr. Herring's workmanlike description to his unapproachable portrait. Pyrrhus the First is a golden chesnut, with marks of white, after the manner of Elis, on his hind legs, and a blaze on his face; a beautiful blood head and light neck; very fine deep shoulders, good arms and legs, long quarters, muscular thighs, and hocks remarkably well let down. He stands fifteen hands three inches high, and is altogether a fine specimen of a first-rate race-horse.

SUMMARY OF PYRRHUS THE FIRST'S PERFORMANCES.

In 1846 he has started twice, and won twice:

The Newmarket Stakes at the First Spring Meeting, value clear	£650
The Derby Stakes at Epsom	5250
	£5900

ON THE POTATO DISEASE.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

Of the great and increasing extent, at the present period, of the potato disease, there is, I fear, no longer any reason to doubt; and so clearly have these facts been established, that many very true friends of their country have zealously commenced an inquiry as to the best substitute in our possession for this extensively employed root. The Dean of Westminster has pretty well directed our attention to the most easily available of these, in case of the absolute failure of the potato (*Farmer's Magazine*, v. 24, p. 19). They consist of peas-meal, barley-meal, and oatmeal; and, as Dr. Buckland observes, peas-meal was the staple food throughout Europe before the introduction of potatoes. "Let us," he says, "for a part of this and next year, for once live as they lived three hundred years ago." Barley-meal, mixed with other flour, or eaten with other kinds of food (for it is too heating by itself) is very nourishing. Oat-cake is the bread of all Scotland, and of a great portion of Ireland, and the north of England.

It is almost fruitless to inquire into the origin of the disease or its cure; for we are only rewarded by increasing doubts and difficulties. Dr. Lyon Playfair, in his able lectures on the nature and causes of the disease in potatoes, has collected together nearly all the valuable facts hitherto noted on these heads. The proportion of water in the diseased potato is certainly more considerable than in the healthy specimen. Dr. Playfair obtained the following results from his experiments :—

Variety of Potato.	Contained Water.	
	Healthy.	Diseased.
Keswicks . .	75.3	80.7
„ . .	75.5	81.3
York reds . .	72.8	79.0
„ . .	67.3	74.7
Kidneys . .	71.4	75.7
Shaws . .	72.1	83.0

That the disease is not new to the potato is certain. "It must have existed," says Dr. Playfair, "ever since the potato itself;" and M. Boussingault informs us that at Bogota, in America, where the plant is indigenous, the disease has been long known; so long that the Indians do not know of its being introduced. It has been attributed, amongst other causes, to too much rain, in 1845; too little sun; to the exhaustion of the potato species by very long continued croppings; to the peculiar electrical state of the atmosphere; and to the effect at length produced (and this seems to me as the most reasonable suggestion of the many) of digging up the potatoes in the autumn, and keeping them half the year in pits and other places foreign to the natural habits of the plant.

The best practical remedy for the disease in future, and for the security of the present crop, is a far more important consideration. On this, a valuable little tract, by my brother, Mr. George W. Johnson, has recently made its appearance; and after having carefully compared his experiments and observations with my own, I am led to the conclusion that the treatment he suggests is by far the most certain of success of any that have been hitherto proposed. He says, "The remedy is very simple; and, as is usually the case, is preventive rather than curative; viz.—*Plant at the close of September, or in the first week of October.* Last year I planted at the latter period every variety, both early and late, which I cultivate; walnut-leaved, ash-leaved, Julys, and red-nosed kidneys; and they all have yielded crops so free from disease that my gardener has not detected a peck of ulcerated tubers among all those taken up as they have been required. But other crops of the same varieties, planted in the spring of the present year, are extensively diseased and much less productive. A plot of Cornish kidneys, which I obtained direct from Penzance, particularly clear and sound, and planted in the spring of this year, produced plants not only having half their tubers ulcerated, but their leaves much curled; and the produce consequently is very small. I planted last October some tubers which were literally masses of rottenness, but each having some eyes prominently vegetated, and attached to small portions of the liber yet undecayed. My gardener observed to me this day (August 28th), that the produce of these is as healthy as that from untainted sets planted at the same time. I directed him to take up the two first roots we came to; and the produce from these was no less than twenty-seven potatoes, weighing in the aggregate 16 lbs. 13¼ oz. Of these, seventeen tubers were quite large enough for table use. This will be readily perceived by the following table, shewing the respective weights of the tubers :—

1	tuber weighed	.	12¼ oz.
3	„ „	(each 8¾)	26¼ „
1	„ „	.	8¼ „
1	„ „	.	7¼ „
1	„ „	.	6½ „
1	„ „	.	6 „
1	„ „	.	5½ „
8	„ „	.	23¾ „
10	„ „	.	13½ „
27			109¼ oz.=16 lbs. 13¼ oz.

"Mr. J. Smeed, of Bromston, in the Isle of Thanet, though no friend to early planting for the main crop, admits that, in 1845, 'the early potatoes escaped almost unhurt in many localities.' (*Gard. Chron.* p. 501). Mr. E. Compton, of Water Newton, near Wansford, states that ash-leaved potatoes planted in October and November, gave a crop perfectly free from disease, and every way better than that from sets put in during the March of this year. (*Ibid.* p. 518.) Mr. H. B. Mason, in Dorsetshire, and another party in Norfolk, agree that 'the autumn-planted have escaped, whilst those planted in spring have been affected.' (*Ibid.* p. 533.) Mr. Barnes, the highly intelligent gardener at Bicton Gardens, in Devonshire, though he does not think autumn-planting specific against the disease, says, in a letter now before me, dated August 24th of the present year, 'We have had astonishing crops of potatoes this season from the autumn-planted, and what we have left in store keep very well in charred matters.'

"TREATMENT OF PRESENT CROPS.

"Allow the crops of all varieties to remain undisturbed until the close of September; and then, the earlier the better, take up so many as will afford a sufficient number of middling-sized tubers for planting for next year's crop. By middling-sized I mean such as weigh from 2 oz. to 3 oz. each. Keep these out of the ground not an hour longer than is unavoidable. I recommend the crop to be taken up no faster than the ground is ready for immediately planting the middling-sized tubers. Dig just enough ground for one row, and then plant with a dibble, without treading on the newly-dug soil, that it may lie as loosely as possible over the sets; for its being well permeated by the air is an additional security against the penetration of frost; air being one of the worst conductors of heat, and consequently the best excluder of cold, which is no more than an abstraction of heat. Plant six inches deep, twelve inches apart in the rows, and the rows eighteen inches apart. No frost, however severe, will injure them at that depth, if the soil is not clayey or wet. If it be either clayey or wet, then drop in a handful of coal-ashes over each set. The autumn-planted crop will appear later above ground than the spring-planted. Keep the plants well-hoed, but do not earth them up. The haulm, both foliage and stem, will be quite dead early in August. This year it was completely dead and dry by the 14th in crops of Julys and red-nosed kidneys planted last October.

The potatoes necessarily taken up when getting those required for seed, store away in the coldest place at command, and in earth or coal-ashes. But if the space be not required for other crops, let the potatoes remain in the ground where grown, to be taken up as required. The only precaution necessary is to clear away the weeds and refuse, and with a hoe to draw up the earth so as to form a ridge three or four inches additionally deep over each row. As required, a fortnight's consumption may be taken up at a time during any open weather in winter.

"Leaving the potatoes until required for seed undisturbed in the soil wherein they were grown, is not broached by me as a new practice, but as a salutary one, too little heeded; and to its efficacy I offer the following additional testimony:—It has been practised for some years on a few farms south of Perthshire, 'with the desired effect of preserving unimpaired their vegetable properties. The same practice is adopted by the natives of New Zealand.' (*Gard. Chron.*, 1844, p. 251.) And Mr. Girdwood, of Bute, says, 'I have known the plan of keeping those intended for seed in the ground all the winter, having tried it for several years past with uniform success.' (*Ibid.* p. 596.) Mr. Burnet, of Gadgarth, says, 'he invariably found potatoes left in the ground come up vigorously without any failure at all.' (*Ibid.*) Mr. Allison, of Mearns, says, that if whole potatoes be used for two or three years, and the crop be left in the ground, the disease will become extinct. Sir Robert Bateson, Mr. Goodiffe, Mr. M'I, and Mr. Fleming, bear similar testimony, from experiments tried in Ireland.

"Mr. Grey, of Dilston, one of the best practical and most enlightened farmers of the present day, has long practised autumn-planting; and, from his repeated and accurate experience, states that it yields, on the average, one-third more than spring-planting. In 1844-5 he made further experiments on a large scale, and thus narrates the result: 'In October last I prepared my land, and planted my potatoes in drill rows of thirty inches width, applying fold manure below the sets, but leaving three rows unplanted for each intermediate month between October and April inclusive. Three rows were similarly dunged and planted in November, three at the end of December, three early in March, and the remainder in April. January and February were too severe to permit planting. To produce ten stone weight of potatoes there required to be taken up

Of the October-planted .	30 yards
,, November ,, .	32 ,,
,, December ,, .	32 ,,
,, March ,, .	44 ,,
,, April ,, .	45 ,,

This demonstrates 'that a loss of power is sustained by allowing the seed to remain in pits till the spring.' (*Ibid.* p. 719.) Mr. Grey adds, that autumn-planting was adopted, not suggested, by himself; for it was long-before practised by other farmers in Cumberland, in Glendale, and on the Tweed.

"Mr. Barnes, head-gardener at Bicton Gardens, Devon, in a letter to me, dated August of the present year, says, 'It will be proved in time that the race of potatoes is no more worn out than is the human race. We have no tubers affected with the disease where soot and charred refuse were used as manure, but the stalks and foliage are attacked by the insects. We have had astonishing crops of potatoes this season from the autumn-planted, and what we have left in store keep very well in charred matters. Our seed tubers, too, at present are sound and good, having no appearance of disease; but then they have been well dressed with soot and charred sawdust, with a small portion of slacked lime added, and well greened of course. I am quite satisfied with them at present. *Though our autumn-planted crops are so abundant, we have none worth digging or taking up from those planted in spring.*

"RATIONALITY OF THE REMEDY.

"It has been suggested that either fungi or insects are the cause of the disease; but I think both these are excluded by the fact that it appears in every quarter and latitude of the globe—in the frigid climate of North America, in the temperate locality of Devonshire, and between the tropics at St. Helena. Now, I know of no fungus or insect that has its habitat alike uninfluenced by heat or cold; and even less conceivable is it that a fungus or insect is just created for the purpose of destroying the potato crop. The fungus or insect, it is more rational to conclude, must have existed throughout time, and its ravages have only been felt by increasing degrees, as the potato has gradually reached a state of disease fitted for the nutriment of the parasite. The same and other facts preclude unfavourable seasons from being the *cause* of the disease, though they may hasten its progress. The disease is said to be as prevalent this year as last, yet no two years could have had seasons more different. It is quite clear that no local cause—such as the employment of any particular manure, the staple of the soil, or the mode of culture—can be the origin of the disease, for the crop has been grown on all possible varieties of arable soil, with and without manures, and in various modes; the sets have been dug in, and dibbled in, the plants have been earthed up, and left unearthed, yet in all and in each has the disease appeared. The cause, then, must be one of universal applicability, for the disease is epidemic in the widest sense of the term. Does it arise from the vital powers of the varieties being exhausted? No; for, in many instances, the most recently raised from seed are as productive of diseased tubers as the oldest cultivated kinds. Does it arise from the almost universal practice of taking up the tubers as soon as the stems are dying or dead, and keeping those tubers out of the soil for four, five, or more months? I am of opinion that this is the cause. The practice is nearly universal; it is the practice throughout Europe, as it is in America, St. Helena, and the hill districts of Hindostan; and in all those regions the disease prevails. It is not the practice in New Zealand, and there the disease is unknown.

"Now, has the withdrawal of bulbs and tubers from the soil the effect of gradually rendering them and their progeny diseased? I think no horticulturist or vegetable physiologist will answer in the negative. A writer in the *Gardener's Chronicle* of the present year (p. 478), most correctly observes, that the bulbs of hyacinths, tulips, and crocuses, keep well in the ground, but, if taken up, have a strong tendency to decay. But what effect has this treatment upon the plants to which they give birth? Why, it imparts to them disease. The strain, the beauteous variegation of the tulip's petals, are the effects of disease. Leave the bulb in the soil throughout the year, and it returns to its natural vigour and simple colours. No variety, occasioned and preserved by such artificial treatment, will endure beyond a few years. It is no effectual objection that seedling potatoes are now affected with the same disease, for such diseases are hereditary in vegetables as well as animals, and the seedling's tubers have been subjected to the same keeping out of the soil for months as were its parents. Neither is it an effectual objection to say that only of late years the disease has prevailed, for it has been noticed for full fifteen years, and it is only by such detention from the soil through a series of years, that the disease is advanced to its prevailing malignant form. It is only thus that varieties of the tulip and dahlia are gradually destroyed*.

"I quite agree with Dr. Lyon Playfair in thinking that the disease itself is an ulceration or decay of the potato tissue, arising, like all other putrefactions, from its combination with an unnaturally large amount of oxygen. The diseased spots appear first near the spiral vessels, which convey air to the internal cells of the tuber. The rapid decay of the cells, I also agree with Dr. Playfair in thinking, arises from their unnaturally weak constitution; a weakness we have already seen, from Mr. Grey's experiments and almost universal experience, occasioned by a lengthened detention of the tubers from the soil.

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* It is no new disease, no modern introduction into the lists of vegetable nosology. I have noticed it occasionally for the last fifteen years. From 1830 to 1841 it seriously injured the potato crops of Germany, and is noticed by M. Von Martius as the "potato gangrene.—Von Martius "On the Epidemics of Potatoes."

"But whether this detention is or is not the cause of the disease, matters little in comparison with the fact that early autumn-planting is a preventive of its occurrence. If its cause be either parasitic fungi or insects, still early autumn-planting is an effectual remedy, for usually the parasites do not make their appearance until August, by which time, if early autumn-planting be adopted, the tubers are ripened, may be taken up, stored for a month as before directed, and those for the next year's crop replanted after the pest is overpast.

"I would earnestly impress upon every one to throw aside all prejudice upon this highly important point, and not to prejudge without a trial. Let the directions here given be strictly followed, and I have no doubt that the potato murrain will become of trifling consequence just in proportion as PLANTING IN SEPTEMBER AND OCTOBER becomes the general practice. Such a mass of evidence as is here gathered together, from every district of the British islands, is above suspicion; and he will do a service to his country who not only tries this easy remedy himself, but sees that it is made known to, and tried by, his cottage neighbours.

"To all, I say, Do not take it for granted one way or other: it is easy to ask the question of Nature, by planting some potatoes this September. *Her* reply may be depended upon."

I will not weaken the force of these observations and proofs by any remarks of my own. Of all the plans hitherto brought forward, this seems the most certain of success; and it possesses, moreover, the very great advantage of being readily, and without expense, tried by every one who possesses a crop of potatoes.

ON TREE PLANTING.

BY J. TOWERS,

(*Member of the Hort. Soc. of London, &c. &c.*)

No. V.

As the season of autumnal planting is at hand, this interesting subject is resumed. The great, the leading principle should ever be impressed, and kept in view: it is that of deep and thorough preparation of the land, including such bottom drainage as shall effectually remove standing water. For although it may be urged, and, indeed, frankly admitted, that there exist in the whole globe no specimens of trees so grand, so majestic as those produced by nature in the wild forests, where man has scarcely intruded himself, much less exerted labour; yet, as we of this favoured country have nothing in common, or which can claim any kindred with such productions, and as it is known and acknowledged that here the progress of plantations depends altogether on the skill and labour bestowed upon them, I claim the privilege to recur to the principle with which these papers commenced, and upon an appreciation of which complete success mainly depends.

The two trees which will form the subjects of this short notice are, indeed, of comparatively humble growth, yet interesting on several accounts. They are the *hornbeam* and the *filbert*. Both belong to the *Amentaceous* family of *Jussieu*—"a group in which all the timber trees of Europe, and most of those of all cold countries, are stationed. The similarity depends upon their producing separated flowers, each of one sex only, the males being always arranged in catkins (*amenta*), the flowers destitute of calyx or corolla, in the place of which is produced a single scale."

I. The hornbeam (*Carpínus bétulus*); genus, 1996; species, 13365; p. 792 of "Loudon's Encyclopædia." The female, or fertile flowers of this genus, are collected in a lax catkin; scales large; leafy; 3-lobed; 1-flowered. The leaves are oval, deeply cut, beautifully veined, and of a lively green. "The wood is white, of a fine, close texture, which makes it peculiarly fit to be wrought into the various forms with which the country people of all nations have delighted to ornament their yokes." Such are the remarks we find in Loudon as above. The hornbeam can be raised from seeds; but the process belongs, properly, to the forest-tree nursery: the tree will prosper in any good loam, where, if properly treated, it can attain 30 feet or more in height, and form a pretty object, the leaves being peculiarly beautiful. Gilpin, in his "Forest Scenery," just notices it, thus:—"Nearly allied to the beech in a picturesque light, is the hornbeam. It grows like it, when it is suffered to grow; but it is generally seen only in clipped hedges, where it is obedient to the knife, and with a little care will never presume to appear out of form. Its wood is white, tough, and flexible." The truth is, that the hornbeam-hedge produces one of the best defences of the nursery garden; for, like the dwarfed beech, it retains the foliage, when dry, throughout winter; and therefore protects hardy plants in pots, and those less hardy kept in frames, in secluded parts of the ground devoted to such purposes. The late William Cobbett, in his "Woodlands," has some appropriate observations on the formation of this hedge, to which I refer the reader. If recollection do not mislead, Finchley Common was, thirty or forty years since, the site of great numbers of this tree, clipped and pollarded, yet still retaining bold, single trunks.

II. The filbert (*Córylus avellána*)*; var. alba, rubra,* the white and red filbert nut; and *grandis,* the cob nut. Of corylus, the fertile flowers are recognised in those beautiful crimson threads which make their appearance early after the turn of the year. "The germens are several, surrounded by a scaly involucre; stigmas, two; nut, one-seeded, surrounded at the base with the enlarged, united coriaceous scales of the involucre." As choice, the red-skinned filbert is preferred in point of flavour; the cob for its great size. All are raised by suckers or layers, for seeds are doubtful; and all grow freely in hazel loam. As Kent—the neighbourhood of Maidstone in particular—is famed, the following account of the method of cultivation and pruning as there practised is from "Baxter's Library of Agricultural Knowledge:" it was taken from a description given by the Rev. William Williamson, and published in the fourth volume of the Horticultural Transactions. I abbreviate it, so as to retain only those passages which refer exclusively to the filbert. The suckers should be planted where they are to remain, whether in the garden or in more extensive plantations. In three or four years, or whenever well established (previous to which they are not to be pruned at all), they are cut down to within a few inches of the ground: thus five or six strong shoots will be produced. In the second year after cutting down, these shoots are shortened, one-third being generally taken off. Then, to make the figure regular, let a hoop be placed within the branches, to which fasten the shoots at equal distances; thus, also, the middle will be kept hollow, so as to admit the influence of sun and air. In the third year, a shoot will spring from each bud; and these shoots must be suffered to grow till autumn, or till the fourth year, according to their strength, when they are cut down nearly close to the original branches, and the leading shoots of the last year shortened two-thirds. In the fifth year, several small shoots arise from the base of the side branches which were cut off the preceding year; these arise from small buds, and would not have been emitted had not the branches been shortened. It is from these shoots that fruit is to be expected. In a few years they will become very numerous; and many must be taken off, particularly the strongest, in order to encourage the production of smaller ones; for those of the former year become exhausted and decay; but whether decayed or not, they are always cut off by the pruner; and a fresh supply must therefore be provided. Such is the routine of preparation; and after this time, the leading shoot is every year shortened two-thirds, or more should the tree be weak; and the whole height of the branches must not exceed six feet: every shoot, also, that is left to produce fruit is to be tipped, to prevent the tree from being exhausted. Mr. Williamson does not altogether approve of this method, which, as he justly remarks, may be called *a system of spurring* calculated to force out bearing-shoots, which otherwise would not be called into existence. Old trees, not originally trained to this form, may be educated to it by taking advantage of some strong shoots which may spring from the root, and cutting down to the ground the old tree—or, in the event of barrenness or decay, all such barren portions—and then commencing, with the new wood, the Kent system of pruning. Mr. Williamson founds his chief objection upon the uncertain production of fruit; for although 30 cwt. may have been gathered per acre in particular grounds and years; yet, upon the average of years, not more than 5 cwt. may be the estimated amount. In order to insure a fair yield *every year,* he proposes to leave a large proportion of shoots which do not promise to be so productive of blossom as the shorter ones, and thus to follow nature more closely; pruning moderately, so as not to weaken the tree by excessive bearing on the one hand, and, on the other, not to leave them so entirely to their natural growth as to prevent productiveness by allowing a superfluity of wood. Such shoots he usually shortens in the spring of the year to a blossom bud. In the year 1819, he tells us that he had 2 cwt. of filberts upon fifty-seven trees, growing upon three hundred and sixty square yards of ground.

It is found that if filbert-trees be left to themselves, they are very apt to run to wild, straggling wood, little productive at any time, and becoming deformed in figure: the bottoms of the trees also produce a thicket of useless suckers. These should be obliterated; and the best method of removing them, and at the same time to strengthen the mother plants, is, we are told, to expose the roots, a moderate distance from the stem, to the frost of winter, filling up the excavation, in the spring, with manure.

Several years since, I planted a row of filberts, taking the single suckers from trees at a short distance. The loam is a strong hazel earth, and it was simply trenched. The trees grew rapidly, and spread so much that I was last year obliged to remove every other tree. They have not been systematically trained, and are of nice figure; but their fertility, from some cause, is not satisfactory. Hence I conclude that a somewhat rigid spurring of the lateral shoots growing on a certain number of mother branches is indispensable. The centres of the trees ought also to be left open, or trained goblet-shaped; and every sucker should be cut up, or weakened by exposure during winter. A moderate and regular crop of filberts scattered over every retained branch, is much to be preferred; and it can be attained by some such treatment as we bestow upon a dwarf apple-tree, which it is an object to keep within seven or eight feet of the ground at its summit, the branches proceeding from one low, single stem.

ESSAY ON THE ADVANTAGES OF FARMERS' CLUBS, WITH SOME ACCOUNT OF THE RULES AND TRANSACTIONS OF THE HARLESTON FARMERS' CLUB.

By Robert Blyth Harvey, Secretary to that Society.

Although this kingdom has long been celebrated for its practical agriculture, yet it is notorious that the discoveries in science which distinguish the present century have had but little relation to husbandry. In all kinds of manufactures, in the machinery by which they are made, and in the arts and sciences in general, the most extraordinary improvements have been effected during the last twenty years; but the progress of agriculture, although considerable in particular districts, has yet been chiefly confined to them; and they have there resulted, more from unexpected discoveries arising from the variations in practice adopted by cultivators, than from the light of science having been especially directed towards their acquirement.

A different era is evidently dawning on agriculture; practical farmers are turning their attention to the science of their business, and scientific men are devoting their knowledge to the improvement of the practice of husbandry; associations of various kinds are fostering the efforts of both, and men of large property, character, and intellect, are taking the lead in the advancement of the most useful and interesting of all the sciences. In none is there greater scope for improvement; and it is the object of the present essay to endeavour to point out a means of obtaining and spreading that improvement amongst the farmers of this kingdom.

The first question that naturally arises on considering this subject is, What has conduced to the advance of other sciences over that of agriculture; the latter confessedly as producing the necessaries of life, being of more importance than those which minister to the luxuries of mankind? Is there any advantage which has tended to increase the knowledge in manufactures of all kinds, and in the arts and sciences generally, the want of which has retarded the progression of agricultural improvement? I have no doubt these questions will be answered in the affirmative, and that it will be readily conceded that the opportunities which persons engaged in manufactures, and therefore necessarily living in masses, have had, of frequently meeting to consult on and discuss their various interests, have had the most beneficial effects in obtaining and spreading a general knowledge of their art; and that the comparatively scattered situation of farmers, and the consequent want of societies like Mechanics' Institutions and other similar associations, have materially tended to prevent an equal increase of knowledge amongst the cultivators of the soil. This fact has indeed long been acknowledged, and were it necessary I could offer in support of it the opinions of many eminent men; but I will content myself with an extract from the very eloquent speech of Mr. Webster, at the late splendid meeting at Oxford. He said:—

"Is it not obvious to the most common observer, that those who cultivate the soil have not the same convenient opportunities and facilities of daily interchange and comparison of opinions, as the commercial and manufacturing interests? Those who are associated in the prosperity of commerce and the manufacturing interests of life naturally congregate together in cities—they have instantaneous communication—their sympathies, feelings, and opinions are communicated like electricity through the whole body; but how is it with the cultivators of the soil, separated, spread over a thousand fields, each attentive to his own acres, with only occasional opportunities of communicating with each other? If among commercial men chambers of commerce, and other institutions of that character, and if among the trades and guilds these are found expedient, how much more necessary and desirable to have some such institutions which at least annually shall bring together the representatives of the great agricultural interest!"

I am equally aware, with Mr. Webster, of the advantages which will result from bringing *annually* together the representatives of the agricultural interest. But I ask, Would the commercial men, would the members of the Chambers of Commerce, and of the Mechanics' Institutions, have obtained half the benefits which they have derived from those associations, had they met only once a year? I consider that the frequent opportunities which the members of such societies have had of meeting together has been one of the leading features amongst the benefits derived from those institutions. If, then, the farmers of England wish to extend their knowledge, and to improve their cultivation through the discoveries of science, let them establish societies like the Mechanics' Institutions, at which they can discuss the merits of new discoveries, or the improvements in the practice of old, and profit by the experience of those who have had greater opportunities of devoting their time and attention to the science of agriculture. I cannot, indeed, better describe the objects of Farmers' Clubs than by an extract from the excellent prospectus of one lately established, after the model of the Harleston Club, in the Isle of Thanet:—

"The formation of Farmers' Clubs is a new and interesting feature in agricultural history. By means of these institutions much valuable information is diffused, different modes of cultivation are compared and their results ascertained, improvements are suggested and made public, and the interchange of thoughts, opinions, and observations, promotes good feeling, and in various ways exercises a beneficial influence. Among the objects sought to be attained by Farmers' Clubs are the following:—To ascertain the nature and qualities of the soils and subsoils of the district; to inquire into the comparative value of different sorts of manures; to test by experiments alleged improvements in cultivation, in agricultural implements, or in the management of stock; to discover the most profitable varieties in corn, seeds, or roots, and the most advantageous rotation of crops; to collect information respecting the state and progress of agriculture, by correspondence, by the establishment of agricultural libraries, and by such other means as may be deemed expedient; in a word, to advance the interests of agriculture in every possible way—reducing theory to practice, and throwing the light of knowledge and science over the most useful and important of the arts of life."

The allusion to agricultural libraries in the above prospectus brings me to a part of the subject which, although the last mentioned, is not amongst the least of the advantages derived from Farmers' Clubs. It has been impossible for persons engaged in agriculture to procure any books treating on that science but at a heavy outlay of money, purchasing them at their sole expense; as should they have the wish or opportunity of joining the book club in the nearest market town, they will not find in it works treating on farming; and yet, if agriculture is to emerge from the stationary position in which, from a want of the application of science, it has so long been placed, how can this be accomplished but through the medium of books, and more particularly of periodical works, which, by placing before us the suggestions, the experiments, or the practical knowledge of other cultivators, enable us to benefit by such information, and to pursue our own improvements with much better prospects of success?

Having thus attempted to show some of the advantages of Farmers' Clubs, I would consider the objections to them; but, although there may be some difficulties to surmount in their general institution, I know of no objections to them when once established. I am aware that the scattered situation of farmers, which has been before alluded to, may be stated as the chief obstacle; but this, in my opinion, is not so serious a difficulty as it has been considered. If farmers have further to go than merchants or tradesmen to a central place of meeting, are they not better provided for going? and, I think, when the benefits to be derived from such meetings shall be fully understood, very few farmers will object to riding four or five miles to attend them. I may be told, that the general establishment of agricultural associations in each county, in some measure precludes the necessity of the clubs I am advocating; but they are instituted for a different purpose, viz., for rewarding deserving labourers in husbandry, and for encouraging the breeding of good stock, &c., &c. No one is more friendly to such associations than myself. I think they have been, and will continue to be, of the greatest utility; and I hail with delight the establishment of the English Agricultural Society, which, by becoming the focus of all other associations and clubs, may disseminate the information received from each, amongst all the other societies in correspondence with it. But these associations, and more particularly the English Agricultural Society, are designed chiefly for the advantage of the landowners and larger occupiers; and the benefits derived from them, although ultimately descending to all classes, are not immediately within the reach of the smaller tenant. The clubs I am advocating, not to the exclusion of the associations above-mentioned, but in connexion with them, are, from the trifling amount required for subscription, open to the smallest occupier of land. The experience of the Harleston Club proves, that five shillings per annum from each member, with no forfeits for non-attendance at the meetings, is amply sufficient to secure all the advantages contemplated in its establishment; and this sum will surely not be grudged by any occupier of land, particularly when it is considered that the money will be expended in the purchase of agricultural books for his reading.

I now proceed to give a short account of the formation, rules, and transactions of the Harleston Club. This district had for several years enjoyed the advantages of an agricultural association, having for its objects the encouragement of good ploughing, the rewarding of deserving labourers in husbandry, and the promoting the breeding and feeding of good stock. The benefits derived from this association were soon felt, particularly in the first two classes; but some of its members having witnessed the successful establishment, in the adjoining county of Suffolk, of two societies which contemplated, by the discussion of agricultural subjects, the improvement of the members themselves, they considered there was an opening at Harleston for the formation of a similar society, perfectly distinct from the Association.

The Farmers' Club was accordingly established, consisting at first of about thirty members, and gradually increasing to its present list of nearly 140. It is managed by a chairman, committee, and secretary, and is governed by the following rules :—

1. That the officers of this club shall consist of a chairman, secretary (who shall also act as treasurer), and a committee of seven members, all of whom shall be elected annually. Five of the committee, including the secretary, to form a quorum.

2. That at each meeting the authority of the chairman upon all disputed matters shall be final.

3. That it shall be the duty of the secretary to receive the subscriptions, to keep the accounts of the society, and also of the books in circulation.

4. That it shall be the duty of the committee, in the absence of the chairman, to elect a deputy chairman, to take care that at each meeting a subject be proposed for discussion at the succeeding one, and to decide upon all matters connected with the business of the club.

5. That any person wishing to become a member of this club must be proposed by one member and seconded by another, when he may be elected by a show of hands.

6. That the annual subscription payable by each member shall be five shillings, which sum shall be paid in advance.

7. That the club shall meet on the Friday in each month on or preceding the full moon.

8. That the chairman shall take the chair at six o'clock, and any business of the society shall be first transacted; after which he shall call upon the member introducing the subject for that evening, the discussion upon which shall be terminated by nine o'clock at the latest; and all questions upon which it may be necessary to come to a division shall be decided by a majority of votes.

9. That there shall be no forfeits for non-attendance.

10. That the first meeting of the club shall be held at, &c., &c.

11. That the annual meeting for choosing the officers, and auditing the accounts, shall be held in January.

12. That all political subjects shall be totally excluded from the discussions of this society.

13. That the books purchased by this society shall be confined to agricultural and horticultural works, the price of which shall not exceed the existing funds of the club.

14. That it shall be competent for any member to propose the purchase of a work, which, if seconded, shall be ordered or refused by a show of hands.

15. That all arrangements regarding the books shall be decided by the committee.

16. That any member may introduce a friend; but no person residing within five miles of Harleston shall be introduced more than once as a non-subscriber. Such visitor shall be at liberty to take a part in the debate, but not to vote on the subject.

17. That any member wishing to effect an alteration in the above rules shall give notice in writing to the secretary of his intention at one meeting, who shall propose it at the next, when it shall be determined upon by vote.

The above rules, after the experience of eighteen months, we have found to work very satisfactorily; and I would respectfully, but strenuously, recommend to any district about to establish a similar club, the adoption of, and strict adherence to, the ninth and twelfth rules. The necessity of the latter is obvious to every one. Once allow political subjects to come before your club, and it will speedily merge into an arena of party strife, from which no satisfactory results could be derived. The advantage of the former rule may not be so readily acknowledged; but the experience of our club convinces me that, as a means of income, forfeits for non-attendance are unnecessary, and that imposing them would speedily induce many members to withdraw from the club. The other rules sufficiently explain themselves; but, having had applications from gentlemen who are forming societies on the model of the Harleston Club, respecting two or three points of management, I will give the questions, with my replies, as it may prevent the necessity of similar applications.

1st. Do you find it absolutely necessary to have a committee? As the club meets monthly, might not everything be managed in a "committee of the whole house?' If not, what are the duties of the committee?

2nd. Does the secretary take minutes of the speeches or conversation at each meeting, and prepare a digest of the whole?

3rd. How are the books circulated? and where is your library kept?

4th. Have you any regulations respecting smoking and drinking? Should they not be altogether prohibited during the transaction of business?

To the first question I would reply, that we find a committee occasionally useful in transacting any business which may chance to occur between the monthly meetings. The other duties allotted to it by our fourth rule might certainly be managed by a "committee of the whole house," but not, I apprehend, so satisfactorily as by a committee of seven members.

Regarding the next question, it is the duty of the secretary to take minutes during the debate on any subject, of such remarks as he thinks bear strongly on the merits of the question. The discussion usually continues till one side, by the production of stronger facts, a greater amount of evidence, or more valuable and better-supported arguments, are in a considerable majority. He then endeavours to draw up a report on the subject in accordance with the views of that majority. This report is put by the chairman, altered or not, as may be requisite to suit the views of the meeting, when it is carried, and entered in the books of the club, together with such remarks as appear necessary to elucidate the subject; and from these reports and remarks an annual report is drawn up, thus placing in each member's hands a short account of the transactions of the club during the year; and I think it will be readily conceded that the opinions of a large body of practical farmers residing in the same neighbourhood, extended and matured by the advantages derived from discussion, can but be useful and profitable to themselves and neighbours.

In reply to the third question, the books are not circulated in rotation, but are under the care of the secretary, to whom each member applies for any work he requires, and to whom he returns it when read, the secretary of course keeping an account of the circulation. The party proposing any book has the preference in reading it, and after him other members in rotation as they may put down their names; but having already more volumes than members, I find no difficulty in apportioning the supply to the demand.

It is easy to answer the last question, by saying that smoking and drinking are allowed; but it is not so easy to give satisfactory reasons for the departure from the regulations adopted by those societies which have been, in some measure, the models of Farmers' Clubs.

I confess it would be more agreeable to me to see the latter frequented for the objects for which they are instituted, and for those alone, viz., the receiving and imparting of agricultural knowledge; but, in the early stages of them, I do not think it practicable, under such restrictions, to draw together and keep in the society a sufficient number of members to be capable of effecting much good. The subscribers would then, I fear, be at first confined to those alone who are zealous in the cause; more to those who are willing to impart, than to those who seek information. It is a great object to prevail on the latter to come; and although such inducement should in the first instance be the pleasure of meeting their neighbours, and not any zeal in the cause for which they are met, yet in all probability the latter will soon be imparted, and they will then take as much interest in the discussions, and be as willing to give the club the benefit of their own practical experience, as those who required no other inducement to join the society than that of serving the cause for which it was established. To those who think that a glass of grog must of necessity be a great interruption to the business before the meeting, I have much pleasure in stating that in no single instance have we ever experienced the slightest annoyance from it; and although I shall hail with pleasure the time when farmers' clubs shall be sought entirely for the food offered to the mind, yet I will not now reject such repast because it may be alloyed by mingling with it some food for the body.

The following are amongst the subjects which have already come before our club, each of which has had a "full, fair, and free" discussion, and upon most of which satisfactory resolutions have been arrived at.

The use of saltpetre as a manure.
The use of gypsum as a manure.
On the comparative advantages of using fermented or unfermented manures.
On the management, and cheapest method of keeping cart horses.
On spade husbandry,
On the best method of improving the breed of neat cattle in this district.
On stall feeding.
On the best plan of keeping farming accounts.
On the advantages of cutting hay into chaff.
On the turnip fly.
On the effect of soil on manures.

On the selection of seed wheat, and the best method of steeping and planting it, &c., &c.

It will be seen by the above list that we have experienced no want of interesting questions, and the field is I think inexhaustible, and I hold it to be impossible to join in, or listen to the discussion on any subject, without deriving some advantage, either from the confirmation of old opinions, or the suggestion of new ones; and the opportunity which each member has had, by the month's notice given of the question, consulting such books as are applicable to the subject, and of introducing quotations which bear upon the point, adds great interest to the meetings.

In every district there are some farmers who possess more zeal than their neighbours, who perhaps to greater means add also greater desire to try experiments and obtain information. It is impossible to estimate the benefits which such persons may confer on their brother farmers, if they will establish clubs, and freely impart at them the results of those experiments, so that the successful may be practised and the unsuccessful shunned, and thus enable the smaller and less wealthy occupiers to reap the advantage of their experience. No narrow views of self interest ought to prevent this; let their station or acquirements be what they may, in all probability they will receive in return for their scientific knowledge some useful practical information, which may repay them for their own liberality. The increase of knowledge on whatever concerns their occupation in life, should be dear to every one; and as the attainment of such knowledge becomes the interest of all, all should cheerfully endeavour to furnish their share of it, the probability being that the same opportunity which has enabled them to impart more to the general fund of information, will also enable them to draw in the same proportion from it.

The truth of such maxims are, I think, peculiarly applicable to agriculture, and I hope to see a large field for the application of them, in the general establishment of farmers' clubs.

Harleston, November, 1839.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

DEAR SIR,—I readily comply with your request that, as you are about to reprint my essay on the "Advantages of Farmers' Clubs,"* published in the number of your journal for December, 1839, I would refer to it, and inform you if the experience of the seven years which have since elapsed has led to any alteration of the rules of our society, or suggested any improvements in the formation and constitution of similar associations.

That essay was written partly with the view of sparing myself the task of replying to the applications I was then beginning to receive from various parts of the kingdom for information on the subject of our club; but chiefly with the hope of inducing other districts to follow our example, and establish these most excellent institutions for the promotion of agricultural improvement.

It will be seen that I was even then extremely sanguine as to the favourable results of these newly-formed societies; but I confess, with great satisfaction, that I did not then anticipate all the benefits which I believe the agricultural interest has since derived, and will continue to receive from them. During the rapid increase in the number of farmers' clubs in the year 1840, and the eager desire of farmers and others to join them, it was not difficult to foretell that when the novelty which was attracting them had worn off, the attendance would fall off also; and I feared, therefore, that the advantages I so fully anticipated would yet be slow in developing themselves, and as regards the improvements in practical husbandry this is to some extent true. The withdrawal of many members from attendance at the meetings has, by detracting from the interest of them, checked much of the benefit which a more ample discussion of subjects, and a more numerous trial of experiments, would have afforded. But there is another ground of advantage which, notwithstanding the defections I allude to, these societies have increasingly afforded, and that far more rapidly than I could have contemplated in 1839, viz., the improved standing which they have given the tenant farmer. Not only have they formed a bond of union throughout the country, exhibiting the similarity of opinion which, unknown, existed both in the same locality and in far distant districts; but they have brought out talent which was never respected, and have inculcated principles which will prove of the highest importance to the progression of agriculture.

At no period in the history of our country was public attention so directed to farmers and farming as at the present; at no period were the true *principles* of agriculture so well understood; and the advance of those principles, I hesitate not to say, has been mainly owing to the impetus first given to them, and to the support they have since received from the tenant farmers, whose opinions have been gathered from the annual reports of their numerous clubs. That the general system of the kingdom, as regards the tenure of land and other points of importance, has been at variance with these true principles, is now beginning to be generally acknowledged; that a large portion of the imperfect practice so prevalent has been owing to this error in principle, is equally true; and that the removal of the former will immensely increase improvements in the latter, no one will be found to deny. Much of this, I repeat, is owing to the humble farmers' clubs. The opinion which a member might for years have cherished in secret he unexpectedly finds to be shared, not only by all his neighbours, but almost by all his brother farmers; and thus encouraged, he eagerly joins with them in giving utterance to sentiments which, but for the opportunities his club has afforded him, would still have remained unknown.

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* See page 293, of this number.

In the supply of agricultural books, which the sudden demand has brought, agriculture is also largely indebted to farmers' clubs. That a hastily obtained supply should be all of good quality was not to be expected; but the attention which men of science have thus been induced to give to the subject is leading to the happiest results. In the first year or two of the existence of these societies, it was difficult to find books on which to spend the subscriptions; now the reverse is the case, and the supply of agricultural reading fully keeps pace with the demand.

There is another point I might name, which is, that pointing out to the fathers the advantages which science may confer on agriculture, but which their own education has given them little or no taste to follow up, more readily induces them to put their sons in the way of receiving a more liberal instruction, better suited to the altered situations they may be called upon to fulfil; and there is nothing tending to the progression of agriculture from which I augur happier results, than from giving a better education—an education specially directed to their future employment—to the rising generation of farmers.

But, sir, I am expatiating on the advantages of these societies when I ought to be informing you of any change in the rules or management of our Harleston Club. The interest I have always taken in the welfare of these clubs must plead my excuse for the above remarks, and I now proceed to reply to your inquiries.

First, as regards the rules, the alterations suggested by longer experience of the working of our club have been very few in number, and, with one exception, unimportant.

The 4th Rule is that in which the first change occurs: instead of deciding at one meeting what shall be the subject discussed at the next, a meeting is called specially at the commencement to fix upon all the subjects of the year, the various members present suggesting or volunteering questions which, if approved of by the majority, are decided upon for discussion on certain evenings; and the member suggesting them, or some other who accepts the task, is appointed to introduce them. The advantages of this plan over the other are, that each member, whether present or not at the preceding meeting, knows beforehand what subject will be discussed at the next, and is thereby enabled not only to make a point of leaving himself disengaged from other avocations on those evenings when questions are coming on in which he feels the most interest, but also of increasing his acquaintance with the subject. The only objection that can be urged to the plan is, that all the monthly meetings being pre-engaged, should any subject of particular interest unexpectedly occur, there is no opportunity of discussing it. When such cases arise, special meetings are called on intervening evenings for the purpose of considering such subjects as may be thought of sufficient interest for the purpose.

As regards the 6th Rule, we continue to find five shillings per annum an ample subscription; but the next is altered by substituting the Wednesday nearest the full moon for the Friday, the former being market-day, and as such more convenient for many members who reside at a distance to attend.

There are no other rules altered needing any comment except the 12th—"That all political subjects shall be totally excluded from the discussions of this society"—which has been expunged! This complete departure from the principle on which the club was first founded, and of which, as may be seen by my former essay, I was then a warm advocate, requires some explanation. Although at former times there have not been wanting to farmers topics of political excitement, at no previous period have measures been before the legislature which the agricultural body considered of such importance as those which, during the last three or four sessions, have occupied the attention of parliament. Improved practice is highly desirable; but it was thought by many that some of the contemplated parliamentary measures involved points of prosperity or ruin to the farming interest. As on this point, as well as on many cases of practical agriculture, there was a difference of opinion, it was argued that, if it was wise to discuss the latter—to try and find out the most correct practice—so also must it be prudent to form a just opinion regarding those important questions which then agitated the public mind. To this no one objected, but several members considered that the club should not be made the arena for such discussions, whilst others thought that, when assembled to talk over their interests, the most important subjects ought not to be excluded. It is useless to name all the opinions offered on this knotty point; but, to show how near those opinions were divided, I may state that, on the first division, the rule was expunged by a small majority, and that in a few months it was again inserted by an equally close division, and for another year political subjects were again excluded from the club. To exclude them, however, from men's minds was not so easy, and converts from restricted discussion gradually appeared, as it became more and more apparent that great changes were contemplated by the legislature; and at length the question was finally settled, at the last annual meeting of the club, when the 12th rule was once more rescinded by a large majority—not, however, without the loss of some valuable and much-regretted members, who, feeling strongly upon the subject, seceded from the club. My own ideas on the change are unimportant; but, having in the former essay offered so strong an opinion on the subject, I ought, perhaps, to state that I was an early supporter of the free discussion principle, considering that, at the former period, I had not contemplated the near approach of such important agricultural political questions as have since been agitated. How much I was also influenced in this change of opinion by my own long entertained views of free trade, and by a natural desire to see others hold what I believed to be a correct opinion—namely, that it would ultimately be more beneficial than injurious to agriculture—I cannot say; suffice it that, readily as I had, at the formation of the club in 1837, advocated the confining our discussions to subjects of practical agriculture, I promoted, as far as I could, the expulsion of the rule; and the result warrants me in saying that the change has promoted the utility of the club. We have this year discussed the following amongst other questions :—" The Operation of Machinery, as affected by the Poor Laws;" "The Cost and Value of Protection to the Farmer—the Statistics of the question rather than the Principle;" "The Assessment of Cottage Property;" and there yet remains on the list for the October meeting " The Law of Settlement." These are all political questions; yet who shall say that they are not of the deepest interest to the farmer, and such as it is incumbent for him to form a correct opinion, as upon any practical subject? I have said above that, owing to farmers' clubs, tenant farmers have obtained a different standing. If this be true, they will be more consulted on the policy of such questions as those enumerated above, and therefore the greater necessity that they should make themselves well acquainted with them in all their bearings; to which nothing will better tend than a familiar discussion on their advantages or disadvantages. The resolutions arrived at on those questions are before the public, and will be thought sound or otherwise according as they agree with the opinions of those who criticise them; but I assure you that, contrary to what was predicted by the opponents of the change, the discussions were carried on as free from acrimony as those on practical farming.

A plan has been adopted, for the last two or three years, of sending to the local and metropolitan agricultural press a short account monthly of the resolutions arrived at, in preference to waiting for the publication of the report at the close of the year. It was thought that, as the subjects were usually chosen suitable to the time of year in which they were discussed, much of the interest in them would have evaporated when that season had passed by. For instance, I send you herewith the resolution lately arrived at " On the Planting of Wheat," which, of course, possesses more of interest now than it would do if published after wheat-sowing was over.

In conclusion, allow me to express a hope that the zeal which has hitherto supported these useful institutions may long continue, and that the benefits to be derived from them may equal the warmest expectations of, dear sir,

Your obedient servant,
Robt. B. Harvey.

Fulham, near Harleston, Norfolk,
Sept. 22, 1846.

HARLESTON FARMERS' CLUB.

Sept. 2nd, 1846.

Subject.—The Planting of Wheat—Thick or thin, early or late, Sowing—Dibbling or Drilling—and the Cultivation of Bean Stubbles for Wheat.

Resolution.—It was arranged that the discussion on the first two points of the question should be taken together, and on the other two separately; and also decided that in this district ten pecks per acre might be considered thick, and five pecks per acre thin sowing; and that the early part of October might be called early, and the latter part of November late sowing.

The discussion having commenced with the above explanation, it was considered that, as regarded the first point—namely, thick or thin sowing—no positive rule could be laid down, as the quantity of seed must always depend on soil and season; that, however desirable it might be on good land, very clean, to sow a thin seed early, yet with the general farming of the kingdom it would be a dangerous practice. Several members of the club who farm highly stated it to be their constant practice to sow late (frequently in December), finding thereby the advantages of a stiffer straw and a greater yield; and these would be afraid to decrease their quantity of seed. Two of the members entertaining these views had had the advantage of seeing Mr. Hewitt

Davis's farm, but were not thereby convinced that the extreme of thin sowing there practised was applicable to this district. After a lengthened discussion it was decided that, as the farming of the kingdom improved, the seed corn might be gradually reduced; but that at present, for the general tillage of this district, the club could not recommend a departure from that practice which long experience had sanctioned, of planting from five to six pecks per acre early, and eight pecks per acre late, with an intermediate quantity for an intermediate time.

As regards dibbling or drilling, the majority of opinions were in favour of the latter, simply because of the correctness of machinery, compared with the uncertainty of manual labour. There seemed to be a unanimous opinion that, if the dropping could be regulated with precision, which machinery alone could effect, dibbling would be preferable on many soils. It has always been, and continued to be, largely practised in this neighbourhood. The advantages of treading in one case, and of horse-hoeing in the other, were not lost sight of in the discussion.

Lastly, the cultivation of bean stubbles for wheat was considered, and evidence was given of superior cast from unploughed stubble highly manured for the previous crop. On the other hand, it was found by some that, although the practice ensured an almost total absence from annuals, the deep-seated perrenial weeds, such as colt's-foot, cat's-tail, and, above all, bind-weed (convolvulus), not having received any check from ploughing, were exceedingly troublesome, the latter particularly so at harvest time. Further trials were recommended to decide how far the advantages of a solid bottom and freedom from annuals counterbalanced these objections.

The club cannot close this lengthened resolution without regretting that it is less decided than usual, which it trusts the nature of the subject will satisfactorily account for.

TWO DAYS IN THE NEIGHBOURHOOD OF LANCASTER.

BY AN AYRSHIRE FARMER.

Lancaster, the ancient capital of the county palatine, is an old-fashioned, aristocratic-looking place, much less lively and bustling than the generality of English towns of the same size. Its streets are narrow, crooked, and ill paved, and, with the exception of the castle, the parish church, and the lunatic asylum, does not contain much to attract the attention of a stranger. The castle may be seen through on obtaining an order from a county magistrate. It was founded about the year 305, but there is little of the original structure remaining. The next oldest portion was built by John of Gaunt, a statue of whom stands above the arched gateway. The modern part, including the county courts, is not more than fifty years old. The courts, which are large, are in the Gothic style of architecture, with high vaulted roofs and stained glass windows, and they are richly embellished with carved work. They have altogether an imposing appearance. On going through the principal apartments, we were surprised at being conducted into a room up stairs, in the front of which executions used to take place; and at being shown the rope-marks on the beam, from which many unfortunate criminals had been suspended; but it seems to be the custom to point out these things minutely to the visitors. It must require a depraved taste to take an interest in what is so very repulsive to every person of feeling and humanity. The old parts of the buildings are used as debtors' wards, and as a county penitentiary. There are about 120 prisoners confined just now, which is much under the usual number, and is one among many evidences of the gratifying fact that full employment and good wages for the mass of the population have a direct tendency to lessen the amount of crime.

The asylum for pauper lunatics is situated on a hill near to the other side of the town, and, when completed, will be on a large scale. A tract of land, about thirty acres in extent, is in course of being inclosed by a high wall. It was worth next to nothing in its original state, but this year a considerable portion of it is yielding a good crop of potatoes. Its main use consists in its affording space for exercise and amusement, and in its being a source of employment for the patients. It is very tastefully laid out in walks, winding up to the summit of the hill, from which there is a fine view. On the one side is seen the coast winding away past Fleetwood to near the Ribble, and the rich level district beyond the Wyre; on the other, the low verdant hills stretching up either side of the Lune. Behind are black heathery mountains, as bleak and barren-looking as our own Scottish moorlands; and before you, and almost under your feet, is the town of Lancaster, with the old castle seen to great advantage on the opposite height. Farther along is the fertile land between the Lune and the coast, with Morecambe Bay and the Cumberland hills in the distance. When we visited the establishment, a number of patients were employed on the walks and other works; some were amusing themselves about the courts; while, within doors, smiths, wrights, shoemakers, weavers, tailors, &c., were busy at their respective occupations, not a single patient being under restraint. We felt much interest in an old blind man, who was sitting at the door of one of the workshops, making a walking-stick with a figure of a serpent twined around it. "I have a much finer one finished," he said; "it is standing beside the clock; I will go for it." "No, no," said a little grey-headed man who was near; "I will fetch it for you," and hastened off. On returning with it, he said, in an affectionate tone — "We are very comfortable companions, the old blind man and poor Tom the madman." There are no beings in this world altogether wretched. There is always some nectar infused into the bitterest cup to make it endurable. The old man, doubly afflicted with blindness and insanity, and his faithful friend "poor Tom the madman," seemed to be a source of much happiness to each other. The most of the inmates, indeed, looked surprisingly contented; and they seem to be very kindly treated by the benevolent manager. One of them was shrewd enough to remark lately, that it was better to be mad, and to be confined in the asylum, than to have to go to the workhouse. There are 665 patients at present, 315 of whom are females. On an average there is one interment weekly. The burial ground is within the walls, and there is generally a grave standing open.

One striking feature of this district, and, we believe, of the most of England, is the beauty and cleanliness of the villages, which are thickly dotted over the country. It is quite charming to see the little old houses, shaded by large trees, and half hidden by roses and evergreens, and, where there is a spot in front, to see it so nicely kept. The villages, altogether, wear a delightful aspect of rural happiness. Many of the houses are very old. The date of erection is generally engraved on a hewn stone above the door, and numbers of them are thus shown to be as old as the reign of Charles the Second. The farm-houses are much superior to ours: most of them are two-story double houses, and finished in a very comfortable manner. But many parts of the country excel Ayrshire in this respect. When one reflects that an intelligent tenantry add so much to the value of the land, in many instances in this country doubling the rental as compared with similar soils and situations in England, it does not seem right to keep Scottish farmers living, as is too frequently the case, in dwellings which an English proprietor would not think sufficiently commodious for farm labourers. At the same time, it must be admitted that the English, in general, excel us in the aptitude for making the most of the space they have within doors, and for neat arrangement around their habitations. It is not a little remarkable that agriculture should lag behind, where so much enterprise and ingenuity is displayed in everything connected with manufactures; and that where so much taste is shown in regard to villages and private houses, it does not extend to the cultivation of the fields. In the course of a drive up the Lune from Lancaster by Hornby and Burton, into Yorkshire, and returning by Kirkby Lonsdale, and Burton, in Westmoreland, we did not observe a single dressed hedge, or one that had the appearance of ever having been cut, unless it were in the vicinity of a gentleman's residence. The smallness of the fields is particularly noticeable in the rich and beauteous valley of the Lune, and in the adjoining country, and must be no inconsiderable loss. In whatever direction you may chance to look, you will see a *cluster* of fields, six, or eight, or ten of which might be advantageously laid together. The hedges, too, are not, as here, confined to the smallest possible space: they have invariably, as accompaniments, huge backs and wide overgrown ditches. In a place where the richness of the soil holds out strong inducements for improvement, it is wonderful that such an obvious and little costly one as the removal of a wide, needless fence, should never occur to the farmer, or, at least, never be practised by him. But to some people, even in this age of movement, nothing is so easy as to stand still. We remember being told by a gentleman, who owns an estate near the centre of Lancashire, that, on one occasion, when a tenant of his called at the Hall, he went out with him and showed him a remarkably fine field of Swedish turnips. After explaining how, by the use of superior implements in working the land, and the substitution of a little guano for part of the town dung in manuring, he had raised his turnips much cheaper than could be done by the usual custom, he asked his tenant why—seeing the crop so much superior, and the outlay considerably less—he should not adopt a similar method. The reply was a too characteristic one—"Well, squire, this is all very grand; but we do just as our fathers did." How frequently has this "doing as our fathers did" been a heavy drag on the social advancement of the human race!

There seems to be a great want of system about the generality of the farming throughout North Lancashire. Ask a farmer what rotation is, and he will stare; he never dreamed of such a thing, and can scarcely tell you what kind of crop he intends to have at a future period on any particular field, farther than if it is fallow, he will have wheat; or if it is a light soil under turnips he will have barley. A considerable portion of almost every farm is kept in old lea, from the supposition that, if ploughed, it could not be made to yield good pasture again, and, as a natural consequence, the arable part is over-cropped.

On the fine land up the Lune there is little cultivation; it is mostly grazing and meadow. It is said to feed two lots of cattle in the season, and to be *too good* for cropping. There cannot be a doubt that grazing will pay better than bad cultivation; but it is not so plain that the application of skill and capital to the cultivation of good land would not be still more remunerating when markets are so good, especially where the soil is open and adapted to the growth of turnips, and there are no stunted rushes or other aquatic plants to be seen to indicate the existence of those cold, stiff subsoils which the majority of Ayrshire farmers have to contend with.

The pratice of keeping a great breadth of fine land in meadow, and spreading dung over it every other year, allowing the best portion to exhale into the atmostphere, seems to be a very indolent way of jogging on, particularly as the price of hay, at a distance from the large manufacturing towns, is not so high as to hold out any reasonable inducement for adopting such a system; and we were surprised to see the practice followed, to some extent, on the farm of a very able writer on agricultural chemistry. But how seldom do mere scientific men excel as practical farmers! In this instance the bulky, untrimmed hedges, foul pastures, tall thistles overtopping the corn, &c., would have induced any person from the north at once to have set down the occupant as a regular *fireside farmer.*

The great want throughout the whole district is the fundamental improvement, thorough draining. Almost the only attempt of this kind that we saw was on a small patch of thin land in the high country between Kirkby Lonsdale and Burton. In addition to the draining, a field of good wheat in a cold neighbourhood, well-cleaned green crops, and large compost heaps, were evidences that some energetic person was rising superior to circumstances.

Another great drawback to the former is the want of proper implements; but it is gratifying to find that they require only to be introduced in order to be appreciated. About a twelvemonth since, a Scottish thrashing machine was set up at the farm at Thurnham Hall, and already, we believe, there are upwards of thirty within the circuit of a few miles, and a considerable number of which have gone from the neighbourhood of Ayr. Such common implements as drill-ploughs, grubbers, &c., are quite unknown; but as there is a sprinkling of good farmers in the district, there can be little doubt that their example, in the introduction of these and in other improvements, will soon have a beneficial tendency, and that in a few years the agricultural produce of the district will have vastly increased.

The method of hay-making is very different from that followed in Scotland. The hay is carefully shaken out when mowed, on the first day thereafter; in the evening it is put into very small cocks. It is again shaken out in the morning, turned in the course of the day and put into larger cocks. The next good day it is shaken out a third time, and carted to the stack, where it is not thought to be in good order unless well browned by heating. In some instances the heat is so great as to cause spontaneous combustion; but these, of course, are cases of extreme mismanagement. This method of hay-making is certainly better calculated than ours for preserving the natural juices of the soft meadow hay, but such frequent tossings would shake the seeds entirely out of rye-grass. We observed a very peculiar plan of moving in Westmoreland. The mower cuts as far forward as he can into the grass with the first stroke, and without moving from the place clears away the cut grass with the next. He then takes a long step, and repeats the operation. He thus cuts hay only at each alternate stroke, and in order to make the same progress as other mowers, would require to cut twice the distance forward. This method is said to be common throughout the south of Westmoreland.

We paid a short visit to a spirited breeder of shorthorned stock, on the confines of Yorkshire. His stock is a pedigree one, and his farm extends to about 380 Scotch acres, more than the half of which is rich old pasture, so that he has every advantage for rearing. He showed us a large octavo volume of pedigrees, and a supplementary volume which is not now in the market, but which he had borrowed from a gentleman, and copied at full length. He enters regularly into a book the age of his calves, with the names of their sires and dams; and in the event of any of them proving superior, or when selling, he can give the pedigree exactly, which usually adds considerably to the market value of the animal. Might not a similar custom be advantageously followed by the more successful breeders in Ayrshire? We are not aware of any reason why *Jock the Laird* should not be as famous in his own sphere as *Comet* or the *Duke of Northumberland* in theirs. The following, copied from a printed card, is a specimen of the style in which pedigrees are given. The figures within parentheses are references to the bulls as numbered in the large book, for the purpose of tracing farther:—"UNION JACK (red), *bred by* ——, *now the property of* ——. UNION JACK was calved the 20th of May, 1843, and was got by Sir Charles Tempest's celebrated bull Dan O'Connell (3557), dam (Belvidera) by Belvidera the Fourth (3129), grand-dam (Princess) by Remus (2523), great grand-dam by Election (1901), great great grand-dam by Cleasby (142). Union Jack was so named from his uniting the celebrated breeds of Sir Charles Tempest and Mr. Bates."

It is a disputed point with some, whether the shorthorned might not be good dairy cows, if attention were paid to their development in that respect. At Thurnham Hall, twenty-five cows, nearly pure-bred, are kept; and the amount of produce during the month of July was about sixty pounds of cheese daily, and twenty-five pounds of butter weekly. We suspect that this would beat many of our Ayrshire dairies; but it should be borne in mind that the "gang" is of the best description; and, besides, from the great size of the cattle, more Ayrshire cows could be kept on the same extent of pasturage. We are strongly of opinion that Ayrshire cows would do well about Lancaster. From its situation on the west coast, between the Yorkshire mountains and the sea, the climate is moist, and not dissimilar to our own. About one-fifth less rain falls during the year.

At the Lancaster fair, about a month since, winter and spring cheese sold as high as £3 per cwt. They are exposed in bulk at the fairs, and the business is over in a few hours. The cheese is not salted in the curd. After being dressed, it is put into a vessel containing strong brine, and the upper side covered with salt. The position is reversed every morning for seven days, when the process is considered to be complete. We are not aware of any particular advantage to be derived from this tedious and laborious method. Perhaps they may retain their shape fully as well in hot weather, but they are not likely to keep so long. From whatever cause, putrid cheese is much more commonly seen in England than in this country. It may arise from prejudice, but we are decidedly of opinion that the *gudewives* of Ayrshire are unexcelled in the art of cheese-making.—*Sept. 3rd.*

ON MEASURE-WORK.

BY HUGH RAYNBIRD.

(PRIZE ESSAY OF THE ROYAL AGRICULTURAL SOCIETY.)

Believing that the society's object in proposing a prize for the best account of measure-work is to induce competition among those who by observation have become acquainted with its practice, and living in a part of the country where a good portion of the hoeing, ditching, reaping, mowing, threshing, and other kinds of agricultural labour, are performed by piece-work, I am induced to offer the following description of our mode of proceeding.

In commencing the details of the system of measure-work adopted by us, and by the farmers in our neighbourhood, I shall labour under much difficulty; for I chance to belong to that class of home-spun farmers who are perhaps better able to work with their hands than they are with their heads, and are generally better qualified to perform the manual operations of the farm-labourer, than to write an essay upon the subject. However, I hope the want of skill in composition will serve as an apology for the errors that may appear.

There are many ways of paying the labourer, peculiar to different parts of the country; but the chief difference lies between the day-labourer, who receives a certain sum of money, or its equivalent in other things, for his day's work, and the task-labour, whose earnings depend upon the quantity of work done. The employment of men by task-work has been practised in this county (Suffolk) almost from time immemorial, if we may be allowed to judge by the following interesting extracts from Sir John Cullum's History of Hawstead, his information being obtained from authentic sources :—

"In the year 1281 the prices of various kinds of grain, the produce of this village (Hawstead, Suffolk), were as follows : of wheat from 4s. 3d. to 4s. 5d. a quarter; of barley, 3s. 6½d.; of new peas, 2s. 9½d. to 2s. 11½d.; of old peas, 2s. 4½d.; of oats, from 2s. 2d. to 2s. 4d. This was a year of moderate plenty, and may therefore be considered as the standard of the prices of grain about this period. In the same year (1281) the price of a bullock was 8s. 6d., of a hog 2s. 6d., of a pig 6d.; of threshing a quarter of wheat 3d., of silico (a white wheat) 2½d., of barley 1½d., of peas 2d., of draget (barley and oats mixed) 1d., of oats 1d.

"In 1389, wheat sold for 4s. and 5s. a quarter, barley for 3s., oats for 2s., bolymong (peas and beans grown together) for 2s. Wheat was threshed for 4d. a quarter, barley and peas for 2d.; meadow ground was mown for 6d. an acre; malt made for 6d. a quarter.

"In 1388, 30 acres of oats tied up by the job (per taskam), 1s. 8d.; 6 acres of bolymong (beans and peas), cut and tied up by the job, 3s. 1d.; 16 acres of peas cut by the job, 8s.; 5 acres of peas and bolymong cut and tied up by the job, 2s. 6d.; 3 acres of wheat cut and tied up by the job, 1s. 11d.

"In 1389, 212 reapers hired for one day, 3d. each, besides their board; 13 acres of wheat cut, tied up, and treselled (treseland) at 7d. an acre; 1 acre of oats cut, tied up, and tresselled at 5d.; 6 yards of canvas for the table, 12d.; grinding 5 quarters 1 bushel of malt, 8d.

"In 1682 the following wages of labourers were rated and appointed by the justices of the peace, at their quarter-sessions holden in the town of Bury St. Edmund's :—

"Wages by the year—

	£.	s.	d.
A bayliffe in husbandry . . .	6	0	0
A chief husbandman or carter . . .	5	0	0
A 2nd husbandman or common servant above 18 years of age . . .	3	10	0
Under 18 years of age	2	10	0
A dairy-maid or cook . . .	2	10	0
The best hired servants, with meat and drink for harvest	1	2	0
An ordinary harvest man . . .	0	18	0

"N.B.—Without meat and drink, their wages were doubled.

"Wages by the day.

A man haymaker, with meat and drink .	0	0	5
A woman haymaker	0	0	3
A man-reaper in harvest . . .	0	0	10
A woman-reaper	0	0	6
A common labourer at other times (in summer)	0	0	6
ditto (in winter) . . .	0	0	5
Women and weeders	0	0	3

"At this time (1780), a head servant who lives in the house, receives for wages 7 or 8 guineas a year; a maid, 3 guineas; a boy, 2 guineas; a day labourer has 1s. 2d. in summer, and 1s. in winter, besides an allowance of beer; for threshing a coomb of wheat 1s., of barley and oats 6d. or 7d.;

for mowing an acre of grass 1s. 4d.; a weeder of corn has 6d. a day."

These details, collected by Sir John Cullum, though in some measure foreign to my subject, sufficiently prove that our present practice of let-out piece-work is far from being a modern one; and the manner in which it was conducted has in all probability remained in many respects without any great alteration. From these records we may also make a comparison—as Sir J. Cullum has done—of wages anciently paid, with those of the present time.

A system of measure-work may be used with advantage to the farmer, in almost every kind of agricultural labour, with the exception of that in which horses or other cattle are particularly engaged: other exceptions are jobs of short duration, and the tending of sheep or cattle.

Piece-work holds out to the labourer an increase of wages as a reward for his skill and exertion; and as he knows that all depends upon his own diligence and perseverance, he becomes more interested in his employment than the day-labourer. The task-worker is also more independent in his character, which arises from the knowledge that so long as he performs his work to the satisfaction of his master, he is not under that control to which the day-labourer is always subject. But though the labourer by task-work will not require the eye of his employer to stimulate him to industry, he must not in any way be allowed to abuse the confidence placed in his honesty, by slighting or hurrying over his work. Regular taskmen, however, are much less likely to be careless than day-labourers only casually set to work by the piece; and to prevent deception, as well as to acquire a knowledge of the value of labour, the keeping correct accounts is absolutely necessary: this is generally done by means of a journal in which the employment of the men is entered every day, and the amount of money advanced at the time of payment. By adopting this plan, the sum earned per day may easily be ascertained, and a fair price be adjusted between master and man. Another way will be for the farmer to take the quantity of work done by a day-labourer in a given time, and from this calculate the price to be paid by task. However, there must always be an uncertainty attending this, arising from circumstances over which the farmer has no control; and we must be guided in fixing a price by the nature of the soil in some operations, and in others by the bulkiness of the crop: work in which the spade or shovel is used, such as draining, ditching, filling soil into carts, trenching, and digging, the nature of the soil will affect the quantity of labour; mowing, reaping, and all harvest operations, whether with corn, hay, or roots, will depend in a great measure upon the bulk of the crop.

Among the advantages of task-work to the labourer are—

1. The occasional employment of his wife and children, who in some kinds of work render material assistance, and add considerably to the earnings of the married labourer.

2. It gives the labourer habits of exertion, for he finds his earnings depend entirely upon the diligence which he exercises; and should the labourer even be inclined to be indolent, he will be obliged to perform an equal share with his fellow-workmen.

3. It stimulates the skilful labourer to learn the best and quickest way of doing his work, for he well knows that he is certain of employment at a good price, if he is able to perform his work in a superior manner; and the quick dispatch of labour will add to his earnings.

4. The wages of a steady and industrious task-labourer will amount to more than the earnings of the day-labourer, and therefore he may live more comfortably.

5. He becomes more respectable and independent in his character, and he takes more concern in his master's affairs and well-being than the day-labourer.

The advantages of task-work to the farmer or employer are as follow:—

1. The quick dispatch of labour; for in hay and corn harvests, as well as in hoeing root-crops, it is often of the utmost importance to have the work performed as quickly as possible.

2. A greater quantity of work may be done for a given sum of money than by employing day-labourers.

3. Taskmen do not require so much looking after as men engaged by the day.

4. The farmer can employ his steady and skilful labourers by the piece; by thus giving the preference to the labourers who execute their task in a workmanlike manner he renders them a pattern for the other men.

In most kinds of task-labour I would not advise the employment of many labourers in one company; though in hay and corn harvest, sowing turnips on the drill system, dibbling wheat, and in some other cases, a combination of force is necessary. The objection to great numbers being together is, that there may be some men of loose habits, who will induce the others to spend a portion of their earnings in drink; when this is carried to any extent the work is in general done badly. As an instance of the bad effects produced on the moral conduct of the labourers themselves by the promiscuous employment of great numbers of both sexes, we may mention the gang system practised in parts of Norfolk and Suffolk, and which is a great cause of vice and demoralization among the class of people who are obliged to work in them. In this practice a man called the ganger or undertaker agrees with the farmer for certain work, generally hoeing wheat and turnips, harvesting and storing away root-crops, dibbling wheat, or any light work in which women and children are employed. The undertaker having made a bargain with the farmer, gets together an assemblage of labourers of all descriptions and characters from the neighbouring towns and villages; these have often to walk some distance to their work, and are then exposed to all the corrupting influence of bad companions; their wages are uncertain, for as soon as the weather becomes unfavourable, or the job is ended, they are thrown out of employ. To take the place of the gang I would either have a steady man, paid a shilling or two a week extra, to superintend the children, or put out work in which they are required, to men with large families, who would then have an opportunity of overlooking the behaviour of their own children.

The measurement of task-work may be most exactly taken by the chain for land and the length of drains and ditches, and the tape for taking the cubic contents of heaps of soil and manure, the dimensions of clay-pits, and the square contents of thatching. I need hardly remind the farmer of the assistance he may obtain from the agricultural table-books, which will be found very useful, and may be had at a price within the reach of every one.

The rates of payment for task-work given by me are those paid during the last ten years; the day-wages have been successively 8s., 9s., and 10s. a-week; the present wages for a common day-labourer are 10s. for summer and winter; during harvest upwards of £1 a-week is earned; and in haymaking-time beer is given in addition to the common price of a day's work. A woman working from eight in the morning to six in the evening has 8d. or 10d. a-day.

The usual hours of day-labour with us are in summer from six in the morning to six in the evening; in winter as long as it is light; out of this the labourer is allowed 1½ hours for breakfast and dinner. Men employed with horses work from six in the morning to half-past two in the afternoon,* including a short time for breakfast: during harvest, from five in the morning to seven in the evening, or as long as the farmer pleases; out of this they rest about two hours.

The quantities of the various kinds of work which I shall state as performed in a given time, are taken from task-work actually done by labourers in our employ, and may therefore be considered an average; though, from many causes, it is impossible for one quantity or one price to be taken in every case or situation.

The standard measures are always used; for, by adopting these, I am more likely to make myself understood by the greater part of my readers than if I had used any of those obsolete local measures, which I am sorry to see in use in certain parts of the country; they are the cause of many mistakes which might be remedied by adopting the standard weights and measures.

In detailing the various operations to which a system of measurement is applicable, I shall divide my subject into separate heads, to each of which a distinct mode of measurement is suited.

1st. The kind of task-work to which land or square measure is applicable, the work being paid for by the acre, rod, or square yard.

2nd. The kind of task-work to which lineal measure is applicable, the work being paid for by the chain, rod, or yard in length.

3rd. The kind of task-work to which solid or cubic measure is applicable, the work being paid for by the cubic yard or load.

4th. The kind of task-work to which corn-measure is applicable, the work being paid for by the quarter, sack, or bushel.

5th. Task-work performed by various kinds of measurement.

I. Task-work to which land or square measure is applicable.

TABLE OF LAND-MEASURE.

9 square feet . . .	1 square yard.
30¼ square yards . . .	1 square rod.
40 rods	1 rood.
4 roods or 10 square chains	1 acre.

In using land-measure as a means of calculating the earnings of labourers by the piece, it is usual to let or put out the job at a certain rate per acre for such work as mowing, reaping, and hoeing, in which a large quantity of land is gone over; but for trenching and digging in small quantities the square rod is most convenient.

1. *Mowing permanent meadow-grass for hay* is the first operation that will come under our notice; it is one of those operations of husbandry which require to be executed with dispatch, as, by its being quickly performed, the hay harvest is shortened, and every advantage may be taken to secure

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* I find it a much better plan for horses and men, to bait the horses for an hour, excepting in the shortest days of winter; and in summer to let them lie by for two hours, or even for three, during such heat as we have lately experienced.—PH. PUSEY.

To this I agree after experience.—PORTMAN.

the produce in fine weather. This is of great importance in the hay-country around London, where, in the season of hay-making, mowers are in great request, and command high wages. In Suffolk, the rate for mowing varies with the bulk of the crop, from 2s. to 2s. 6d. per acre: beer is frequently allowed in part payment for mowing; the work is then done at 2s., and half a gallon of beer for each acre. The hours of labour in mowing grass are from five in the morning to seven in the evening, stopping two hours in the meantime; they thus labour twelve hours in a day, during which an expert mower will cut 1½ acre; the generality of men will earn in money about 3s. a-day. The cost of cutting low meadow-grass is rather higher than of cutting upland. Mowing clover and rye-grass is generally more quickly performed, and consequently the rate per acre is lower. I find the average price per acre is 2s., or 20d. and half a gallon of beer; the quantity mown in a day nearly 1½ acre; the earnings of a man will thus vary from 2s. 6d. to 3s. The cutting seed-crops of clover and rye-grass does not greatly differ from the mowing for making into hay. Men engaged to mow grass by the day have 2s. and an allowance of beer; but they cannot of course be fairly expected to work so hard if paid in this manner. The making grass into hay is occasionally put out by the job at the rate of 4s. an acre for mowing and making; this gives ample employment to the wives and children of the mowers. But the farmer must not be guided in his opinion of the right time of carting by his men, for if he is, he will in all probability have it carted before it is in a fit state for stacking.

2. *Mowing wheat* is a practice coming into use in preference to reaping; the rate paid per acre depends of course upon the bulk of the crop, and on the abundance of labourers during harvest: for a light crop 6s., and for a heavy one 8s. are paid per acre; this includes mowing, tying, shocking, and raking. The mowing constitutes barely half the labour, though the making and binding the sheaves may be done by boys; a strong lad will make and bind sheaves as fast as one man mows. A man, in a day of ten hours, will mow upwards of an acre; and, with the assistance of another man, or of two boys, he will be able to complete the other operations required in cutting an acre of an average crop of wheat.

3. *Reaping* is also generally done by the acre, and in seasons when the crop is heavy or lodged by rain, it becomes a tedious labour; the price per acre for a medium crop of wheat that stands upright is about 8s.; but if the wheat is lodged, from 10s. to 12s. A good reaper will sometimes cut more than half an acre in a day, but the generality do not cut more than one-third. Reaping beans costs about 6s. an acre. Strangers are frequently employed to mow or reap wheat; I consider it a good plan to supply them with beer at the rate of a gallon for each acre: this will greatly influence the workmen, as they then will have no occasion to go to the beer-shops for drink sold at a high price. The cost to the farmer will be but little, as he can brew beer for the purpose at about 6d. a gallon.

4. *Mowing barley or oats* is usually included in the contract for harvest, of which I am about to give a description. A man will cut upwards of two acres of barley in a day; of oats he will not be able to get over quite so much.

5. *Harvest-work* is generally put out by task. Some farmers give a certain price per man to a company, who agree in return to do all the harvest work in cutting, carrying, and stacking the corn, to which an acre or two of turnip-hoeing for each man is sometimes added. Others hire a sufficient number of men, for four or five weeks, at a certain sum for that time; this method is mostly practised by small farmers, who work with the men and keep them from loitering; for otherwise there would not be much inducement for the labourers to hurry. On the larger farms two distinct modes of hiring are sometimes adopted: the men are divided into two companies—one called the crop-men, who engage to cut a certain number of acres of wheat, all the barley, oats, peas, beans, or any other crop that may be grown on the farm; to pitch and load all the corn, and to turn a portion of it when required; to this is added a certain quantity of turnip-hoeing, about one or two acres for each man. The yard-men, as the others are called, are hired by the month or five weeks; their labour is of various kinds, though principally confined to cutting wheat, unloading and stacking corn, and any other labour that may require to be done. An able-bodied man is usually paid £4 10s., and three bushels of malt, for five weeks' certain employment; while the crop-men, who work by the job, have from £4 10s. to £5, and three bushels of malt, whether their harvest is of long or short duration.

On a farm of 240 acres of arable land, cultivated on the Norfolk rotation, six crop-men are sufficient. The following is a rough calculation of the work performed by each man, and the cost per acre:—

	£.	s.
Cutting (mowing) 8 acres of wheat, at 7s .	2	16
Mowing 10 acres of barley, at 2s	1	0
Pitching and loading 10 acres of wheat, at 1s.	0	10
" 10 acres of barley, at 1s. 6d	0	15
Turning barley	0	3
Twice hoeing 1 acre of turnips, at 6s	0	6
	£5	10

Where beans are grown, the cost of cutting and tying is about 6s.; the cost of making peas is from 4s. to 5s. an acre.

6. *Hoeing* the many crops that are benefited by the free use of the hoe, offers frequent opportunity for the employment of the labourer by measure-work. Turnip-hoeing will first come under our notice. The average price we pay for the first hoeing, or singling out drilled turnips, is 3s. per acre; that of the second hoeing, 2s. 6d.: but when the seed is broadcast, or the distance from drill to drill but small, the cost of singling out will be more. Though turnips planted on the ridge-system are at a greater distance than those drilled on the flat, yet we find, from the necessity there is of pulling the ridges down with the hoe, that the cost is quite as much. In hoeing between the drills of turnips, when the land is soft, the Dutch or thrust hoe may be used at a cost of about 1s. 6d. per acre, where the distance between the drills is 18 inches. Turnip-hoeing is best done by men accustomed to the work, with whom a bargain is made for the completion of the work in a proper manner; the first and second (and third, if wanted) may be done on our land by the same party, at a cost of from 5s. to 6s. an acre.

Beet-hoeing is paid at about the same rate as hoeing turnips, viz., from 5s. to 6s. an acre, for twice going over: a third hoeing is often required, at a cost of 2s. 6d. an acre. More than half an acre of the first hoeing or singling of turnips and beet is generally performed by a man in a day of ten hours and a half; though, as the labour is not very severe, women and men unable to do hard work are frequently employed. The turnip-hoer may derive much assistance from his children, by having a small boy or girl to follow him, and single the plants which have been left double by the hoe.

Hoeing carrots.—Carrots are extensively grown in the sandy soils of Norfolk and Suffolk, and no doubt would be grown much more if it were not for the enormous expense in the labour of hoeing and weeding; this might, in some degree, be lessened, if the drill system of growing carrots were adopted in preference to sowing the seed broadcast. The cultivation of carrots generally gives employment to the undertaker and his gang, who is usually paid for his services by half the crop, or at the rate of 2d. a bushel: for this he finds and sows the seed, does all the weeding, hoeing, and takes up and stores away the crop. In fact, he does everything, with the exception of tillage and carting. The number of bushels is ascertained by the number of cartloads carried away. However, when carrots are drilled, the cost of hoeing will be considerably less; I have known the price for twice hoeing (which includes singling out) drilled carrots at 10 inches to be no more than 10s. an acre.

Hoeing wheat.—From 2s. to 3s. per acre are here paid for hoeing between the drills of wheat. A man accustomed to hoeing will get over three-quarters of an acre in a day: and, as an instance of this, it took two men exactly four days each to hoe 6 acres on a gravelly soil, the drills being about 7 inches apart; they were paid 2s. 6d. per acre. A bargain is sometimes made for leaving the wheat crop clean up to a specified time, usually to the end of June: in that case the wheat receives as many hoeings as it may require, at an average charge of 6s. an acre.

Hoeing beans, peas, and *tares* is done for about 2s. 6d. an acre: a certain difference in the rate of payment is occasioned by the width between the drills; when this is narrow, the work goes off proportionally slower. With us barley is seldom hoed, though oats occasionally are; and if so, at the same price as wheat.

7. *Harvesting root-crops.*—The labourers, in doing this kind of work, may be paid by the acre, or, when the crop is carried off the land, by the number of cart-loads: the former method is to be preferred, as it affords a mode of measurement less liable to dispute. Men with large families are the best to engage in the taking up and storing away roots, as their wives and children will be able to do a good portion of the labour. Harvesting roots is performed in various ways; I shall merely mention those plans most generally used. When the swedes are laid in small clamps of about 40 bushels on the land where they grow, the roots are pulled up and thrown into long heaps, the leaves being first cut or pulled off; the heaps are then covered, first with straw and then with earth. Seven shillings per acre will be a fair remuneration for the labour required in pulling and storing a good crop of swedes in this manner. Should the roots be both topped and tailed, a higher price must be given. Another way of keeping swedes or white turnips is to cover the roots with the plough; the turnips are pulled and laid in a furrow opened by the ploughman, who, with another furrow, covers the roots with soil, leaving the tops above the surface: the cost of pulling and laying in the turnips will be about 3s. an acre; but it must of course be done by children, with a man as overlooker. Pulling, cutting off the tops, and filling turnips into carts, will cost about 8s. per acre, but this must depend upon the size of the roots, where the bulk of the crop is the same.

Harvesting beet.—The pulling and laying the roots in heaps ready to be carted away, the leaves being twisted off by the hand at the time of pulling (which is done by men, and is rather severe labour) is paid for at an average price of 5s. an acre for a fair crop; at this rate a man will earn 2s. a day, for it will take about 2½ days to pull an acre. As the task-men pull the roots, they are filled by boys, and carried to the places where they are stored for the winter. With us the filling is done by day-work, at a cost of about 2s. an acre: four boys, at 1s. a day, filled 190 loads (30 bushels) off 7 acres of land in three days. The beet was pulled in the same time by six men, at the rate of 6s. an acre. *Banking beet* is the covering the heaps, in which the roots are stored, with moulds to keep out the frost; the heap is made about 4 or 5 feet in height, sloping like the roof of a house. A man will cover about 2 rods in length in a day; the rate per rod may be from 10d. to 12d. In a hard, gravelly soil it took six men three days to earth up a heap 30 rods in length; at 1s. a rod they would have earned exactly their day-wages at 20d. a day.

Taking up and storing carrots.—When carrots are sown broadcast and the plants left thick, the cost of taking up and cutting off the tops is sometimes as high as 18s. or 20s. per acre for a fair crop; but when drilled the cost for taking up is much reduced: this is caused by the carrots being handier to fork up when in rows, besides which they are generally singled out at greater intervals, and are consequently fewer in number and larger than those broadcast. We shall find that if the work be done by day-labourers it will take six men to fork up an acre of drilled carrots; I know this to be about an average, from having assisted in this as well as in other kinds of works that I have described. It will take six boys or girls to cut the tops off as the carrots are taken up by the men. If we take the men at 20d. a day, and the children at 6d., we may calculate the cost of an acre will be 13s.; by piece-work it could be very well done for 12s. an acre. If the carrots are a thin plant, the price will be proportionably lower; and if a very thick one, it may be 2s. or 3s. above the sum I have stated. It must be borne in mind that this only includes taking up and topping. I have already given (under the head of hoeing) the details of a practice pursued by many carrot-growers in the west of Suffolk.

8. *Dibbling.*—In the eastern counties dibbling is much practised; and during seed-time the dropping gives employment to great numbers of children. Dibbling wheat is done in two ways—one called "whole setting," when two rows of holes are placed on a broad furrow-slice, the rows being about five inches apart: a man will dibble, on an average, half an acre a day, and will find work for three droppers; the cost for dibbling and dropping is from 7s. 6d. to 8s. an acre. The other is called "three-quarter setting;" one row is placed on a narrow furrow-slice, the holes being rather closer together in the row: a man will dibble nearly an acre in a day; this costs about 5s. an acre. Beans and peas being dibbled at wide intervals, 4s. an acre is a fair price for them.

9. *Haulming* is the cutting or raking into heaps the stubble left by the reapers; the price varies with the bulk and toughness of the straw. A man paid by the acre will haulm, on an average, upwards of an acre in a day; the price is about 20d.

10. *Paring and burning* uncultivated land is generally done by piece-work; the price is affected by the soil, the prevalence of stones and roots, and by the toughness of the sward. Paring is severe labour; the burning also requires strict attendance both day and night; in consequence of this, men will not do this work unless they are able to earn a good deal above day-wages; the usual price is from 25s. to 30s. per acre. Cutting furze, should any grow on the land, is an extra charge: some men are able to pare a quarter of an acre in a day; but there is a great difference in the quantity done in a given time.

11. *Ploughing and other labour done by the aid of horses or oxen.*—In some places this description of work is paid for by the acre, more particularly where oxen are used. In Norfolk the ploughing is sometimes done at the rate of 14d. or 15d. per acre: the ploughman works two pairs of oxen; by keeping at it all day he is able to get over nearly two acres. However, I think the paying for ploughing, harrowing, or any other team-work with the farmer's own cattle, is inferior to the usual practice of hiring ploughmen by the year, or paying them by the day; for in general the greater number of labourers who work with the teams are young men who, if they were employed by the piece, would have too much inducement to slight their labour and overwork their cattle. Besides which, the labour of the teams is constantly changing from one kind of work to another; this arises from the uncertainty of the weather, as well as from other causes, and there would consequently be much difficulty in keeping a correct account of the labour. Ploughing is occasionally done by the jobbing farmer at from 7s. to 8s. an acre; this includes a pair of horses, plough, and man.

Drill-workers are men who gain a living by letting out drills to the farmers, at a certain price per acre, or by the day's work; the charge for a corn-drill, with man to follow, is from 12d. to 15d. an acre; for a corn-drill or seed and manure-drill 18d. an acre is the usual charge.

12. *Digging and trenching.*—Digging one spit deep (from 9 to 12 inches) usually costs 2d. or 2½d. the square rod; the quantity dug will vary with the nature of the soil from 8 to 12 rods in a day. In

1835, when day-wages were but 16d., it took four men eight days to dig, in a workmanlike manner, 2 acres of a clayey loam—each man's work averaged 10 rods a day; they were paid 2d. a rod.

Trenching two spits, or 18 inches deep, and loosening the bottom of the trench, costs about 6d. the rod; a man will, on an average, trench 4 rods in a day.

Digging-in seed turnips: for small roots the ground does not require digging very deep; for laying in and covering the roots we have usually paid 3d. a square rod. To make myself generally understood, I shall describe the operation:—The turnips are laid in a straight trench formed by the spade; two diggings across them intervene between the first and next row of plants. On a sandy soil that digs well, I find that a man, with a boy or woman to lay the turnips in the trench, will get over 10 rods in a day; at 3d. a rod they earned 2s. 6d. a day. When the turnips are large, the work will of course go off slower.

14. *Thatching.*—In measuring thatchers' work, the practice for a round stack is to take the height in feet from the eaves to the top, and half the girth at the eaves; these, multiplied together, will give the dimensions in feet, which may easily be reduced into squares or yards. For a long stack we measure the length and the height of both sides of the roof; but when the stack is hipped, we either allow two yards extra in the length, or measure one in addition to the side: the former method is adopted when the dimensions are calculated in square yards; the latter when the square of 100 feet is used. The price for thatching corn and hay stacks is 1d. a yard, or from 10d. to 1s. the square. I am informed by an experienced thatcher that, with the help of a strong lad, he is able to thatch, in a workman-like manner, 100 square yards in a day, and thus earns 8s.; but to do this he is obliged to work early and late, and leaves the finishing up of his stacks till the busy time of harvest is over. In Hertfordshire, and other places where the thatching is done in a superior style, the charge is nearly double that paid in Suffolk.

II. *Task-work to which lineal measure is applicable.*

TABLE OF LINEAL MEASURE.

12	inches . .	make	1	foot
3	feet . . .	„	1	yard
5½	yards . .	„	1	rod
40	rods or 10 chains .	„	1	furlong
8	furlongs or 1,760 yards	„	1	mile

Under this head are included those descriptions of task-work which are usually paid for at a certain rate per chain, rod, or yard in length; and it applies more especially to ditching, fencing, and draining.

1. *Digging ditches and fencing.*—All operations done with the spade depend in a great measure upon the nature of the soil, as to the quantity removed in a given time. Some, as peat, are dug without much labour; while other soils cannot be dug at all unless they are first loosened with the pick. It has been calculated that a man will dig and move 10 cubic yards of soil in a day, the soil not requiring the pick to be used: this is perhaps under the average; for I find the labourers on the railway are paid 2d. a cubic yard for moving and digging a hard stony soil to the depth of 18 inches; of this they are able to move from 10 to 12 yards in a day.

As I am aware of the uncertainty of this kind of labour, I shall merely mention the prices and details relating to agreements for the execution of this work.—1. Paid 20d. a rod for digging an open drain in a peaty soil; the drain was five feet deep, and averaged six feet in width; a cubic yard was therefore dug for about 1d., or if we calculate it exactly, 18⅓ yards for 20d.—2. Paid 16d. a rod for digging a ditch 3 feet deep, 4½ feet wide at top, and 1½ at bottom; the ditch ran through a variety of soils, principally clay and gravel; this bargain also included, in addition to the digging, the laying in a quick for a fence, and the topping the bank with thorns as a protection to the young hedge: 5½ cubic yards of earth had to be moved for every rod; and it took 70 days of labour for one man to complete the job of 114 rods, the amount for which, at 16d. a rod, is £7 12s., or about 2s. 2d. a day.—3. Paid 1s. 10d. a rod for a ditch and fence in a clay and gravelly soil; the ditch was 4 feet deep, and averaged a little over 4 feet in width, so that nearly 10 cubic yards of soil were removed for every rod.

2. *Draining.*—The cost of the labour required in draining, depends firstly upon the nature of the soil in which the drains are dug, and secondly upon the depth and materials used for filling up. Draining on a *sound clay,* free from stones, may be executed at a *cheaper* rate per rod in length than on almost any other kind of soil; as from the firmness of the clay, the work may be done with narrow spades, and but a small quantity of soil requires to be removed by manual labour. The draining of wet sands or gravels, or clays in which veins of sand abound, is more expensive than on the sound clays, because a broader spade has to be used, and consequently a larger amount of soil removed. Some soils are so hard and stony that they cannot be dug unless the pick is first used; this adds considerably to the expense. On the sound clays of Suffolk and Essex, the price for digging drains, and laying in stubble, heath, brushwood, peat, or whatever else is used, and filling up the drains so far as cannot be done with the plough, is about 4s. or 4s. 6d. the score rods, and 6d. for each eye. These drains are about 30 inches deep. The first spit is ploughed

out; the two next dug with narrow draining spades: half a score rods of this kind of draining is reckoned a fair day's work. Sometimes, however, half a score is above an average; for I know a case on a hard clay, lying just above the chalk, which was so tenacious that the men could hardly dig and fill in 6 rods in a day. The cost of digging, laying in tiles, and filling drains 4 feet deep, on a clay soil intersected with veins of sand, may cost about 6d. a rod. We have just completed digging a drain in a meadow, of an average depth of 3 feet, the first 6 inches turned up by the plough. It took thirty days' labour for one man at 20d. a day to dig 101 rods of drain, one man a day and three-quarters to lay in the tiles (tops and bottoms), and about eight days to fill up the drain; making a total cost of nearly 8d. a rod. The soil was very wet, stony, and hard. On a loamy soil drained to the depth of 4 feet, with a clay subsoil, the upper 10 inches ploughed out, one man would on an average dig 3½ rods per day, throwing out about 10 cubic yards of soil—would lay in about 60 rods of soles and tiles in a day, and fill in 13 rods in a day.

3. *Fencing.*—All kinds of hedging, and the labour required in keeping live and dead fences in repair, and the pulling down old fences, readily admit of payment for task-work by lineal admeasurement. In the management of old fences, one of the practices in this part of the country is to cut down the old thorns even with the surface, and then to make good the loose soil which has been washed away from the roots. The price per rod varies with the age and thickness of the hedge, and with the quantity of soil required to make good the bank—from 6d. to 8d. a rod is usually paid : this includes topping the bank with the old thorns as a dead fence. Three or three-and-a-half rods will be an average day's work : from 20d. to 22d. a day may be reckoned fair wages for hedging work, as in addition to his wages the hedger has all the small and decayed pieces of firewood. Breasting over hedges will cost from 3d. to 4d. a rod, but the price depends entirely upon the size of the hedge. Trimming hedges, or the cutting off the young shoots, with a light hook may be done for a 0½d. or 0¾d. a rod; if shears are used, the cost will be rather more. Where faggots are made, they are paid for by the score; 6d. a score is paid for the most general size, but the price of course varies a little with the size and length.

III. *Task-work to which solid or cubic measure is applicable.*

CUBIC MEASURE,

	1728 cubic inches	make	1 cubic foot
	27 cubic feet	„	1 cubic yard
	2218 cubic inches	„	1 bushel
A fraction over	21 bushels	„	1 cubic yard

This applies to the moving of soil, the filling into carts of manure, clay, marl, or any other soil, the turning of compost and manure heaps; it may also be used in measuring the quantity of peat ashes and burnt clay, should the labour of these operations be done by task-work. Though such work as digging ditches and draining is put out by lineal measure, yet we ought to calculate the quantity of soil to be dug in a given length, and by that means have something to guide us in fixing the price.

1. *Filling, raising, carting, and spreading* clay, marl, or chalk, are frequently let out by the job to men who, at a certain price per yard, agree to find horses, carts, and men, and food for the horses, with the exception that the employer allows grass and straw-chaff. The number of cubic yards carted is ascertained by taking the dimensions of the pit or heap from which the soil has been removed, so that there is no means of deception or occasion for disagreement. The price per yard for carting 1 furlong, is for clay 7d.; a penny is added for every additional furlong; so that if the distance was 2 furlongs 8d., if three 9d. would be charged per yard. The work is usually done with small carts drawn by strong ponies : these appear much better suited to the removing heavy soil than the large carts and long teams which the farmer generally uses in this part of the country. I was told by an old man who has followed the business of clay and marl carter the greater part of his life, that on one occasion he had an opportunity of putting to the test the comparative merits of large and small carts. That when working in the same pit with another party of clay-fillers using large tumbrils or carts, his company of three men filling into small carts drawn by five ponies, were able to accomplish as much as four men filling into large carts drawn by seven powerful horses; the distance and other points being equal. He also informed me that in a week of fine weather he has carted 300 cubic yards of clay filled by three men working 8½ hours a day, or 16⅔ yards of filling and picking down daily.

On our farm, at the first beginning or sinking of a pit, 140 yards of clay were filled by two men working 7½ hours a day during 15 days, giving an average for one man of more than 9 yards. After the pit was sunk to about 8 feet deep, the two men filling and picking down averaged 10 yards each.* The spreading was done by the men and the boys who drove, working about an hour after they had finished carting for the day. The clay was carted in four small carts drawn by four ponies, with another to assist in pulling out of the pit; the distance of carting averaged 2 furlongs, and in this manner 480 yards of clay were filled, carted, and spread at a cost of 8½d. a yard on about 12 acres of land. The labour of filling and spreading clay from a pit by the farmer's own labourers would be as well paid for by measuring the number of cubic yards removed; but this plan is seldom practised, the men being paid by the number of cart-loads, each containing, by rough calculation, a cubic yard; or the carts may be filled up to a mark made in the sides. The carter, who works by the day, keeps an account of the number of loads filled by the men in the pit; and as he is not interested, he will in all probability keep a correct one; but as the same number of heaps of clay are made of each load, it will be an easy mater for the farmer to number the heaps, and thus check any dishonest practices. About 2d. the cubic yard or load is paid for filling clay; if many stones are picked out, the men receive 1s. for each load. The time of filling is about 8 hours in summer and 7 in winter, the remainder of the day being employed in getting down clay for filling in the next day. A man will on an average fill 10 loads of clay besides stones; as an instance, it took 45 days for one man to fill 463 loads of clay, besides 13 loads of stones; or rather over 10 loads a day. The clay at 2d. and stones at 1s. will amount to £4 10s., or about 2s. a day, which may be considered fair earnings. Clay laid in a large heap after being drawn from the pit is perhaps a slower operation than when first raised, for I find men only fill 10 yards each a day. A bargain is sometimes made for filling and spreading clay at from 2½d. to 3d. a load. Barrowing by manual labour must not be omitted in this account of measure work, for earth may be moved in this manner, for a short distance, cheaper than it can be moved by the aid of horses; and even for claying or chalking small fields of 5 or 6 acres, barrowing would be perhaps cheaper than carting. It has been calculated that in sandy ground three men will be required to remove 30 cubic yards in a day to a distance of 20 yards, two filling and one wheeling; but to remove the same quantity in a day to any greater distance, an additional man will be required for every 20 yards of wheeling. The following is a system of barrowing by manual labour sometimes adopted in those places where chalk lies at a considerable depth below the surface:—a shaft is dug down to the chalk; when this is deep enough, the chalk is dug, and pulled up by a rope and windlass at the top; it is then barrowed on the land. The price for barrowing on a piece of land of about 4 acres round about the shaft is 6d. a load of 22½ bushels. This includes both raising and barrowing.

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* I find the quantity of clay filled in a given time is below an average; this arose from wet weather and its being a bad kind of clay to fill.

2. *Filling farm-yard dung.*—This is done at the rate of 2s. a score loads of about 1½ cubic yards each; spreading will be about 1s. 6d. or 2s. for the same quantity.

3. *Turning over manure heaps.*—When the heap consists entirely of farm-yard manure, the labour of turning over is more quickly performed than when the heap is partly composed of heavy soil. There are also two ways of performing this operation, by one of which the work is got over faster than by the other, though the slowest way is greatly to be preferred if the farmer's object is to mix the different substances of which the manure heap is composed. One of the practices is the mere reversing the manure by trenching it over; while in the other the labourer begins at the side, and picks down the manure from top to bottom, mixing it well as he proceeds: he then throws this up with a fork, and goes on alternately picking and throwing up. The general and perhaps the best way of paying for the labour of turning over manure heaps, is by giving a certain sum for each heap: we usually pay from 8s. to 12s.; but this of course varies with the size of the heap, and the nature of the substances of which it is composed. A fair price may be calculated by taking the dimensions in cubic yards; it will cost but a few minutes to make a measurement. Or sometimes the farmer keeps an account of the number of loads carted on the heap, and by that means fixes a price at so much per score loads of about 1½ cubic yards each. For turning over farm-yard manure 1s. per score, and for picking down and turning over heaps composed of earth and manure, 2s. per score loads are paid.

4. *Burning peat-ashes* is an uncertain employment for the labourer; the quantity of ashes depending in a great measure upon the weather for drying the peat. The customary payment for burning peat-ashes is about £5 per 1000 bushels, reckoning 25 bushels to a cubic yard. I think, however, payment by the cubic yard is quite as correct a way of ascertaining the true quantity. The season for burning being at an end, the ashes are laid (previously to thatching) in a rectangular heap of 15 feet average width, 3 feet in depth, and to any convenient length: the length, breadth, and depth being multiplied into each other, and then divided by 27, we shall thus have the number of cubic yards. The price paid by us, per yard, is from 2s. to 2s. 4d.; in an average season of 20 weeks (harvest included) a man and his wife burnt 200 cubic yards, which at 2s. a yard gave them £1 a week.

IV. *Task-work to which the corn measure is applicable.*

TABLE OF CORN MEASURE.

4 pecks . .	make	1 bushel.
4 bushels . .	,,	1 coomb.
8 bushels . .	,,	1 quarter.

Corn-measure applies to threshing corn by the flail —a practice which will, it is hoped, be soon superseded by threshing-machines. However, as a large portion of grain is still threshed by manual labour, I cannot but give it a place in my description of piece-work. The quantity of corn threshed in a given time, either by the flail or by machines, will depend upon a variety of circumstances; the kind of soil upon which the grain grew, the season, and the condition when harvested, will all affect the quantity threshed in a given time. In our neighbourhood (Suffolk) but a small proportion of the farmers have threshing machines of their own; but there are men who get their living by letting out portable machines at a certain price per day: these are generally worked by four horses; the charge for a machine, with a man to tend, is 12s. a day, besides the expense of moving the machine and boarding the man. On an average these will thresh from 20 to 30 quarters of wheat (reaped), from 15 to 25 of mown wheat, and about the same quantity of barley as of mown wheat in a day. The annoyance of shifting the machine, with the loss of time to the horses and men, renders the practice of hiring by the day both inconvenient and expensive. However, as many large farmers are beginning to have horse-power machines, it is to be hoped that we shall soon see the good example of threshing by steam-power which has been set by the northern farmers, followed by their brethren of the east.

1. *Threshing wheat* by the flail is much practised by the farmers who supply the London market with straw, the generality of machines being found to break the straw. In Suffolk the price for threshing and dressing reaped wheat costs from 2s. 6d. to 3s. a quarter—should the wheat yield well, a man will thresh out a quarter in a day. With the common hand-dressing machines 15 quarters may be twice winnowed and put into sacks by two men in a day.

2. *Threshing barley.*—With us a much larger proportion of barley is threshed by hand than of wheat, for it is often done as cheap by hand as it is by our present system of hiring machines. Allowing one of these to thresh 20 quarters of barley in a day of 10 hours, the following will be a rough calculation of the cost:—

	s.	d.
Hire of machine . . .	12	0
Board of man . . .	1	0
Six horses . . .	15	0
Six men at 20d. . . .	10	0
Four boys at 8d. . . .	2	8
Dressing 20 quarters at 2d. .	3	4
Total . .	44	0

The average expense of threshing and dressing 40 quarters of barley of the same description is 40s., or 4s. cheaper than the machine, which will nevertheless have the advantage of dispatch. The rate per quarter for threshing and dressing varies from 1s. 6d. to 2s. a quarter. I have known two men to thresh and dress on an average 15 quarters a week; at 20d. a quarter they earned 25s. weekly. When barley is harvested in large barns 2d. or 3d. a quarter is given extra, for that laid in the middlestead or threshing-floor.

Oats are threshed for 1s. to 1s. 4d. a quarter; beans and peas from 1s. to 1s. 6d. The quantity threshed varies from 1½ to 2 quarters per day.

4. *Clover and other seeds.*—The price paid for cobbing (separating the seed from the straw) and drawing the seed of red and white clover is from 3s. 6d. to 4s. 6d. the bushel of 5 stone of seed. Drawing seed by the flail is a tedious and expensive process, and is much better performed by mills constructed on purpose for the work. From 1s. to 1s. 4d. is paid per qr. for cobbing trefoil; the drawing is usually done by mills.

V. *Task-work performed by various kinds of measurement.*

1. *Trussing hay* for the London market is chiefly done by men who make a business of it, and by practice become exceedingly expert. In Hertfordshire the price for trussing and weighing ready for market is 1d. a truss; a good hand, with the assistance of a boy, will in summer make 100 trusses in a long day. In Suffolk the hay-trusser is neither so skilful nor so well remunerated; the charge for trussing is about 0½d. a truss, or from 1s. 6d. to 2s. a ton.

2. *Picking stones* is paid for by the load of 20 bushels, at about 10d. a load. A woman will generally manage to pick a load in a day.

3. *Riving wood* is done by the stack, at 3s. 6d. for long lengths suited for kiln burning, and at 5s. for short lengths.

4. *Shearing sheep* is done by men who form themselves into a company, and engage to shear the sheep belonging to the surrounding flock-masters. The following are the prices for Down and Leicester sheep:—ewes, 3s. 6d. a score, of which one man will on an average shear twenty-five in a day of 12 hours' labour; hoggets or yearlings, 4s. 6d., of which a man will shear twenty; large fat sheep and rams, 5s. a score. Sometimes the employer agrees to board the shearers; he then pays 3s. a score for hoggets, and 2s. for ewes.

5. In *hiring shepherds* an agreement is sometimes entered into, by which they receive, in addition to their weekly wages of 10s. to 12s., about 6d. for each lamb brought up, and out of this money to be received pay 9d. for every sheep that dies.

6. There are other kinds of agricultural labour, which admit of being paid for by measure-work,

which have not been mentioned; among these are burning lime, cutting chaff, planting cabbages and potatoes; taking up potatoes: the latter operation may be done at so much per sack—we found 3d. to be a fair price; or they may be taken up at a certain rate per acre.

Table of the value of labour in Suffolk.

Wages of a common day-labourer, 10s. a week; at harvest-time, about 3s. 6d. a day.

	s.	d.	s.	d.	
Mowing wheat	6	0 to	8	0	per acre
" barley	2	0	2	6	"
" grass	2	0	2	6	"
" clover and rye-grass	2	0			"
Reaping wheat	8	0	10	0	"
" beans	6	0			"
Pitching and loading wheat	1	0			"
" " barley	1	6			"
Hoeing, singling out turnips	3	0	3	6	"
" second time	2	6	3	0	"
" between drills	1	6			"
" drilled carrots, three times	10	0	15	0	"
" wheat	2	6	3	0	"
" tares, beans, or peas	2	6	3	0	"
Pulling and storing swedes in clamps	7	0			"
Laying in turnips	3	0			"
Topping and tailing and filling turnips into carts	8	0			"
Pulling mangold-wurzel	5	0			"
Filling into carts	2	0			"
Taking up and topping carrots broadcast	18	0	20	0	"
Ditto drilled	12	0			"
Dibbling wheat, whole setting	7	6	8	0	"
Ditto three-quarter setting	5	0			"
Ditto beans and peas	4	0			"
Haulming	1	8			"
Paring and burning	25	0	30	0	"
Ploughing	1	4			"
Harrowing and rolling, each about	0	2			"
Digging	0	2	0	2½	a rod sq.
Trenching	0	6			"
Digging in small turnips for seed	0	3			"
Thatching stacks	0	1			a yard
Digging ditches (various)					
Common Suffolk draining, 30 inches deep	4	0	4	6	a score rods
Tile-draining, 4 feet deep	0	6	0	8	a rod
Cutting down hedge, facing bank, and putting on dead fence	0	6	0	8	"
Filling clay	0	2			per yd. cube
Ditto and spreading clay	0	2½	0	3	"
Filling muck	2	0			score loads
Spreading ditto	1	6	2	0	"
Turning muck-heaps	8	0	12	0	each
Turning over farm-yard dung	1	0			score loads
Picking down and turning over compost-heaps	2	0			"
Threshing wheat	2	6	3	0	a quarter
" barley	1	6	2	0	"
" oats	1	0	1	4	"
" beans and peas	1	0	1	6	"
Trussing hay	1	6	2	0	a ton
Picking stones	0	10	1	0	a load
Riving wood	3	6	5	0	a stack
Shearing sheep—ewes	3	6			a score
Ditto hoggets	4	6			"
Ditto fat sheep and rams	5	0			"

Note by Lord Portman.

There are two points in the ordinary management of task-work which require, I think, some further consideration: I mean the practice of leaving the price of a job to be fixed at its conclusion, and of drenching the men with liquor to superinduce undue exertion. I have found that measure-work, if it be well regulated, is an admirable system; but that the greatest evil results from a delay in fixing the price of the job. I am aware that it is often impossible for the master or the man to make a bargain until one day of trial has been fairly made; and I am aware that sometimes accidental circumstances are developed during the progress of the work which may render the best considered bargains unfair, and therefore not to be insisted upon: but as a general rule, the price should be fixed before the work is begun, for any measure work, in which both parties have had sufficient experience to guide them; and on the second day after it is begun, when either party requires a trial to guide him in fixing the price. The questions for the master to determine are—What is the job worth to me?—What will it cost me at day-work?—What additional cost is it worth if it is finished in a shorter time than men at day-work will complete it in? The questions for the labourer are—How much can I earn in a day at day-work?—How much at this job, with my usual exertion?—How much can I better my income by some extra time, and some greater exertion, if I take this job?

Turnip-hoeing, reaping, mowing, threshing, turning manure-heaps, &c., admit of some standard of value on every farm; but each job requires to be viewed before the actual price is fixed to regulate any variation from the standard that accidents in each year may create. Moving earth, chalking, digging ditches, &c., require an opening of the land to enable either party to estimate the price. The too frequent practice is to say, "Go on, and I will do what is right when we settle." The consequence is generally a squabble on the day of reckoning, for the men expect more than the job is worth, because they have spent so much time over it; and the master offers a little more than the wages of men at day-work, because he will not trouble himself to value the actual job. The fair price is in such cases seldom given. The parishioners often refuse a job at a fair price, because they say "they must have work or be kept." The strangers take the same as a fair bargain, and do well. I could mention case after case to illustrate this fact. The spirit of opposition should be firmly and fairly met by proving, when it is finished, the correctness of the value which had been affixed to the job before it was commenced. It is also essential to estimate the time in which the job can be properly finished; and it should be made a part of the bargain that the job should be completed by a given day, unless the weather prevent it. No other excuse should hinder it, for in the case of illness or other inability the contract should cease at once. It must not be forgotten that no *summary* remedy exists for the enforcing any contracts for measure-work; and that often the labourer who works in a party—of which the foreman alone agrees with the master, and the rest of the men agree with the foreman—is cheated by the foreman, and has no redress for which he can afford to pay. The master should therefore protect the whole of the men by some arrangement as to their individual payment. The drenching with liquor—beer, ale, or cider—is generally approved by the men, as it excites them for the time, and gives them what they call "a heart to work;" but it is very unwise to adopt it as a practice. I advise that, when they can be led to abandon the gratification, a money payment, rather exceeding the value of the liquor, should be made to them, which benefits their families, and enables the men to improve their diet. But at all events, if they cannot be led to abandon the liquor, I should advise the substitution of a supply of meat in lieu of a portion of the liquor, giving thereby strength to the men, and averting the evils of intemperance. Where the men are single or without family, I have found it difficult to lead them to abandon the temporary gratification; but in that case, I would narrow the allowance as much as possible, and give them the remainder that would be due to them in the shape of clothes or tools, for the purpose of proving to them the benefit of my plan. Many masters give liquor as a spur for the momentary exertion to serve their immediate purpose, regardless of the injury done to the men; some give liquor to save their pockets; none, within my knowledge, who have tried to lead the men to abandon that mode of receiving payment, have, after experience, resumed the payment in liquor, though many give, as occasion may suggest, a portion of liquor as a reward for well-timed and good-natured zeal.

PORTMAN.

MONTHLY MEETING OF THE RHINS FARMERS' CLUB.

AUGUST 28, 1846.

On the motion of Mr. M'Bryde, Balcar, seconded by Mr. M'Meckan, Mark, and others, the Right Hon. the Earl of Stair was respectfully requested to officiate as chairman, which his lordship kindly agreed to do.

Mr. HARKNESS said the immediate subject for discussion at this meeting was, the consideration of certain queries issued by the last meeting of the club. And in taking up that subject he would submit, as the course most convenient, first, that the queries should be read; secondly, that certain written answers and information which he had received should be read; and lastly, that the queries should be taken up one by one, and the statements of those present in answer taken down. After which the club might agree upon such practical recommendations as they thought proper to give to the public as to the treatment and preservation of the potato.

This course being judged proper, Mr. Harkness was requested to read the queries, which we will now repeat, as necessary to make the answers and information quite intelligible, and which were as follows:—

1. Had you potato disease in your crop last year? How many acres had you diseased?

2. If so, state what kinds you planted, and what kinds were most affected.

3. Also explain what description of soil your potatoes were grown upon, and when planted—what kinds of manure you used—the quantities or weight, and the effect as regards the disease.

4. What quantity and kinds did you plant this year? and have they shown symptoms, *outwardly*, of being affected?

5. If so, when did you first see any symptoms? Please explain how your potatoes seemed affected, and the progress of the disease.

6. Before seeing any symptoms upon the *leaves* or *stalks*, did you pull any stalks of your crop, and examine the roots and feeders of such haulms or stalks? and if so, did you find them healthy or unhealthy at the roots?

7. Did you not find the stalk and root tinged yellow, sometimes of a rusty colour, with appearance of gangrene similar to the distempered appearance of a diseased young cabbage-root?

8. Did you dissect the part of the stalks which were below the ground? If so, did you find the roots yellow to the heart, rotten, or comparatively dry, woody, and tough? Did you dissect the haulm upwards from the ground? and if so, what appearance did the stalk present? Did you observe any yellow fluid, as it were, proceeding up the stem, between the skin and the fibry part of the stalk? Did you cut the stalks affected a little above the ground; and did they cut stiffly, something like the branches of the willow?

9. In dissecting and investigating the potato plant, did you ever find an instance of yellowness and gangrene in the roots and stalks below the ground, while the stalk above ground and leaves were green and healthy to all appearance?

10. Again, did you ever find a potato plant diseased in the leaves and upper part of the stalks, yet not diseased low down and to the very roots?

11. Did you ever find diseased potatoes at the roots, though the stalk above ground, branches, and leaves, were green, and apparently healthy?

12. Where seed has been used, got from abroad or distant counties, has such produced a sounder crop than that grown from home seed?

13. Has lime or charcoal been applied in your district to the potato since the disease appeared, or have the shaws been pruned, or any other experiment made in hope of staying the disease? If so, explain, and state the result.

Having now read the queries agreed to by the club, he begged next to read extracts from several written communications which he had received in answer. The first was from Mr. M'Cracken, Drum, factor upon Mr. Oswald's estates in the parish of Kirkbean, &c. That gentleman, who was well qualified to judge in the matter, says:—

"I duly received your note of 18th, accompanying printed queries as to the cause of the potato failure. These queries I consider it unnecessary to answer separately, as wherever potatoes were planted in this quarter, no matter what the soil, situation, manure used, kind of potato, or time of planting, they have all but ceased to exist; and I don't expect a seed to remain at Martinmas.

"It is not easy to account for such an universal failure in any other way than from weakness, disease, and degeneracy in the plant from long cultivation, and being too much '*hybrided*.'

"My potatoes showed symptoms of disease this season before any others in this neighbourhood, in consequence (I think) of being sooner planted, part of them being put into the ground about the 1st of February. I planted three different kinds—'Prince Regent's,' 'Cups,' and a kind of potato got from New Brunswick about two years previous, called 'New Brunswickers.' The whole of the seed was cut. The Regents were harder and firmer than either of the other sorts, although all of them were comparatively sound good seed. They all vegetated and looked splendid so far up as the 28th of June, when the New Brunswickers were noticed to become blackened in the stems. In the course of ten days after, the Cups had the same appearance; and in about a fortnight thereafter the Regents gave way. The first appearance of the disease was just as if the field had been situated to leeward of a chimney on fire, and the small flakes of soot had fallen on the leaves. Curiosity and anxiety prompted me, along with some of my neighbours, to examine the tubers; and almost in every case we found one or more of them slightly affected with disease; and in most cases those at the bottom of the drill suffered first. As the disease progressed, I paid marked attention to it; and from minute inspection and observation, I found that whenever the *parent seed* became *rotten*, or even a part of it, immediately the disease appeared in either stem, or fibres, or tubers, and wherever either stem or fibres came in contact with that part of the seed *first* rotten, these immediately gave way, and showed the disease sometimes in the one and sometimes in the other, and frequently simultaneously in both tubers and shaws.

"As long as I could find a sound seed, then all was free from taint; at last it became impossible to find a single seed but what was in a state of corruption; and just as rare it was to find either tubers or stems free from disease, which is now universal. I found it pretty much the same with my bean crop. The original seed had prematurely decayed, something like the potato, the stalks becoming black and withered, though in most cases the bean in the pod had come near maturity before this took place.

"I have no doubt but the high temperature in the end of June and beginning of July may have been the cause of the potato seed becoming *sooner* rotten than in ordinary seasons. This, coupled with the weakness and softness of the seed when planted, may so far account for a failure in this country; but when it is so general over Europe and America, I consider it must in a great measure be attributed to the plant having become weak and diseased from long cultivation; and that the only chance of resuscitation is, by getting a supply of the plant from its native country, in a wild, uncultivated state.

"I shall be glad to hear the result of your inquiries, which I think may tend to show the cause of, and remedy for, the disease in this most useful plant."

The next communication was from Mr. Patterson, farmer, Clumpton, by Dumfries; and he answered each of the queries in their order:—

"*Answers to Queries suggested by the Rhins Farmers' Club.*

"1st. I had disease generally in my potato crop last year, but not very bad.

"2nd. The kinds I planted were Prince Regents and Lothian Blues, and they were both equally diseased.

"3rd. I planted on a light gravelly soil, with a till bottom. I planted the last week in April, with 27 yards dung and 2 cwt. guano, part being planted with 40 yards dung alone, and part with 4 cwt. guano alone. There was no difference as to disease in any of them.

"4th. Planted only 4 acres this year of Prince Regents and Lothian Blues.

"5th. They showed first symptoms of disease on 31st July, upon the first day's planting, and the rest of the field became diseased in the exact order of planting; the leaves becoming first yellow at the bottom of the stalk, then black, and proceeding upwards; the haulm becoming hard and tough at the ground, and the old tuber rotten; and eight days afterwards, the potatoes became affected, and are still turning worse. The top leaves of the shaw are still green, though the leaves generally are all fallen off. To several lots the manure used was, per Scotch acre, 28 yards dung, and 3 cwt. guano; dung alone, 28 yards; guano alone, 8 cwt. 3 qrs. 8¾ lbs.; Liebig's patent manure alone, 6 cwt. 1 qr. 6¼ lbs.; and dung 28 yards, and Liebig's manure 2 cwt. and 16 lbs. I see no difference of the disease in any of the lots, though those done with Liebig's manure seem rather fresher looking than the others.

"6th. Examined them frequently before the appearance of the disease, and found several of the old tubers beginning to rot, and the shaw a little tougher at the ground than it ought to have been.

"7th. Did not find the root so healthy-looking as it should.

"8th. Cut several stalks below ground when the disease had made its first appearance, and found them hard and woody, and very tough; and cut them often since, and find them still turning harder, with the heart of the stalk at the ground filling up, and difficult to cut through with a knife, and the whole stalk much tougher than it ought to be, though still looking fresh; but gangrene is now quite apparent in the root.

"9th. Never found yellowness or gangrene where the shaws were quite healthy, but a general want of healthy appearance in the root, and the old tubers soft and watery, and beginning to rot.

"10th. Never observed a single instance of a plant diseased in the stalk and leaves and the old tuber in a proper state, and the root of a healthy appearance, but in one case of Second Earlies.

11th. Never saw diseased potatoes where the plant above ground was green and healthy, but have seen the old tuber rotten before any appearance of the stalk and leaves being affected.

12th. I have not heard of any seed brought from a distance but what is equally diseased with the home seed. Some of my own were from seed grown on moss land last year, where no disease was seen. This year they are as bad as the others.

13th. I do not know any case where charcoal or lime has been used since the disease appeared, but shaws have been cut off to try and stop the progress of the disease, but with what effect has not been fairly proved. Both lime and gypsum were used as a coating for the seed this year before planting, but they appear to have had no effect in stopping the progress of the disease.

Finally. So far as I have been able to judge, I am of opinion that the disease is not from any atmospheric miasma, but that it is caused by a constitutional weakness of the seed. When the plant arrives at a certain stage, the old tuber becomes rotten, producing disease in the root of the plant, preventing the necessary fluids being conveyed up and down; and, from the stagnation that thus takes place, the leaves die, and consequently, in a short time, the potato begins to rot. Had the disease been atmospheric, it would have begun upon the shaws, and gone down; whereas mine, and all I have seen, began at the bottom and came up, and the topmost leaves are last destroyed. In all the cases I have seen, they have been affected in the order of planting; showing that it is not until they arrive at a certain stage of their growth that the disease makes its appearance; and before it does so, I have always found the old tuber more or less rotten, which leads me to believe that the disease is produced by a constitutional weakness of the potato, and not from any atmospheric influence upon the shaw or leaves.

"P.S.—Since making the above remarks, this morning I have again examined the potato field, and find the top leaves of the shaws of the first and second days' planting nearly all gone, the haulm become quite yellow and pulpy, and the root still further diseased, with the potato nearest to the root and old tubers turned from a dry-looking, hard substance into a watery state, so that, when squeezed in the hand, water spouts out of them. The potatoes that were three days later in the planting are not so far gone, but the top leaves are beginning to spot; and I have no doubt, from the appearance of the gangrene being still more perceptible in the root, that in three days from this they will be the same as the first planted; and should the disease in the potato below ground go on as rapidly as it has done during the last ten days, there will be very few left, as fully one-half of them is already altogether gone, and in the other half there is a good deal of waste in cleaning them.

"19*th August*, 1846. "J. W. P."

He had now to read a letter from Mr. M'Culloch, Whitefield, by Glenluce, which gave an account of the devastation in that quarter:—

"I duly received yours requesting information about the potato disease, &c., in our quarter. I regret its not being in my power to attend the club meeting to-morrow, to hear the matter discussed; but I will now give you all the information I can collect—my own experience, coupled with that of the district. I planted my potatoes two days in April, and to the 16th of May. The disease began to show about the 24th of July to the eye, at a distance, beginning with small spots on the lightest land, spreading slowly for five or six days, by which time it spread over my eighteen-acre field, in about two days totally blackening it. The crop was luxuriant, and a stranger could scarcely have known the way the drills ran. About August 6 scarcely a green blade was visible on the stems. At first appearance of the disease I was under the impression that the growth of the potato might proceed underground for a time, while any verdure existed in the stem or haulm, although the tubers were partially diseased. I can safely say, if any growth, as alluded to, has taken place, it is very little. I examined the field alluded to yesterday, and find the crop thus:—One-half, or nearly, what is termed *soap rotten*, and worse decomposed than the parent, with the exception of not more sound, upon an average, than two or so tubers to each stem. The remainder are fast progressing to decomposition. I find the fermentation under ground excessive, which, in my opinion, accounts in the meantime for the crop rotting so quickly, owing to its being in a diseased state, and never having reached maturity. I may observe I have four acres in moss land, which got blighted in the stems same time as the others. On examining them I find none rotten, unless a small spot where water was lodged in the late heavy rains; neither do I find any external appearance of the disease. If the disease is atmospherical, I would be glad of your giving me instructions how to preserve them, in order that I may try them another season. I am not aware of a single field in this district showing external verdure, but a portion of a field of about forty acres on the shore, belonging to Gillespie (Mr. Anderson). I may observe in the case of these that potatoes on the sea-coast have kept their verdure much better than those inland; but whether the under-ground ravage is the same I can't say. You would do well in this case to write Mr. Anderson. Those on the sea-side were his first planted, and the disease when I saw them was begun, and spreading fast upon the inland or north side of the same field, while those on the sea-side were as healthy and luxuriant as I ever saw a crop. I may also state that Mr. Anderson had another field (I can't say the extent) in the north end of his farm later planted than the one alluded to. I hear that it got affected at just the same time as the others, say one mile or so from the sea. As to turnips, I had some sown in the latter end of May. These came away in fine regular braird (mostly Swedish). I examined them to-day, and in pulling up a number of them, found nothing wrong. Mr. King, Back of the Wall, was telling me, however, that his Swedes had small protuberant shoots or knobs on the roots, and not usual."

Several other communications were referred to, when several members expressed an opinion, to which none dissented, that these communications were of much value. The meeting proceeded to take up each query, when a variety of interesting remarks were made upon them, the substance of which we will endeavour to condense and give.

To the first and second query all answered that their potatoes had been diseased last year, and that all but early kinds had failed, the latter being taken up before the attack.

To the third query it was answered that the disease had affected all soils, and that variety of manure, in quantity or quality, did not exempt the crop from disease.

To query fourth it was answered that all kinds had proved affected this year. To query fifth, that all had shown early symptoms, and the progress of the disease was very similar to that explained in the communication of Mr. M'Cracken and Mr. Patterson.

To No. 6 and 7 several members answered that they had early examined, and found the stalks at the roots and towards the bottom unhealthy, mostly coloured and gangrened.

To No. 8 and 9 it was in like manner answered, that the stem near the bottom was stiff, the roots gangrened.

To query tenth no one had found the stems diseased and not the roots.

No. 11. No answer given, except by Mr. Harkness, concurred in by Mr. Murray from experience.

Query 12. All seeds, from whatever quarter, alike are affected.

Query 13. No member had experience of lime or charcoal being applied to the plants.

The meeting was addressed by Messrs. John Gibson, Mains of Park; M'Meckan; M'Bryde; M'Kaig, Kilhilt; M'Kaig, Barnultoch; Murray, road surveyor, &c.

Mr. **Harkness** said he had examined the growth of the potato crop from an early stage, and he would now take the liberty of stating the result as shortly as he could. About two months ago he examined the stems and roots of the early and garden potatoes, before the leaves or tubers were affected, and from the first to the last of his examinations he found the roots of the potato of an unhealthy, rusty colour, frequently of a dark yellow hue. Many plants showed ruptures in the skin of the plant below, but not above ground, and gangrene either followed or accompanied such rupture. His (Mr. H.'s) examination of hundreds of cases of field or late potatoes showed the same symptoms exactly. In every instance—and he examined many—the roots, fibres, and runners of the potato were in that unhealthy state of gangrene before there was any appearance whatever of disease upon the stalk, branches, and leaves above ground. The colour and gangrene of the roots and stalk below ground had very much the appearance of a diseased cabbage plant in its early state of affection. He (Mr. H.) also observed upon the parts so gangrened ruptures on the stalk of the potato, from the bottom upwards to near the surface of the ground, when the stalk assumed a brownish and unhealthy colour, and when cut or split was tough and woody, cutting and splitting like a willow of equal thickness. He dissected hundreds of plants before the disease was general—many before it appeared at all—and such were the symptoms developed. In cutting the stalk upwards from the affected part, he almost universally saw a yellow-coloured fluid in the organs of circulation, which grew fainter, and disappeared as he proceeded to cut up the stalk, which afterwards became green and healthy. As the disease progressed, the discoloured fluid went farther up the stalk. Yellow leaves of the potato stalk accompanied this discolouration, and formed the first outward symptom of the disease; after which the shaws became often suddenly blackened. The parent plants were generally in a yellow pulpy state when such symptoms were manifested, but sometimes they were not rotten. In the course of such investigations, he (Mr. H.) sometimes found one affected tuber, and that invariably deepest in the ground and next to the seed potato, long before any blackening or appearance of disease came above ground upon either stalks or leaves, but he never found the tubers entirely free from affection where any appearance of that nature came above ground; and after examining the roots of plants, and observing the extent of toughness, gangrene, and ruptures in the stalk below ground, he had no hesitation in predicting that the leaves and branches above would go sooner or later, and the potatoes proceed to decay. Such were some of the leading facts which occurred on an examination of the potato crops during the whole of the months of July and August. He would not at present go into a detailed statement of his reasons for the opinion he had formed, namely, that the disease originated in a ruptured and disorganized state of the functions of the plant, mainly brought about by the suspension of its healthy fluids and the communication of distempered matter from the parent seed. He had laid before the meeting facts worthy of consideration, and he would on another occasion state more fully the nature and process of the disorganization alluded to, which led to the destruction of the potato. Meantime he would suggest that the club should recommend some practical course to be adopted by farmers, with the view of preserving seed potatoes for next season. The club might, if it thought proper, discuss the question what was the cause of the disease; but the practical question, how potato-seed could be saved, was of more immediate importance, and should not be deferred. He (Mr. H.) had examined the potato crops again and again, along with Mr. Murray, road surveyor, who could speak to the whole of the symptoms spoken of by him. Mr. Murray had also followed out the experiment of lifting and greening his potatoes for seed, and could now show samples of these in an excellent state, and apparently quite sound—geen to the heart—both early and late. He recommended the cups to be ploughed up, exposed to the air, and greened.

Mr. **Murray** submitted to the meeting his potatoes as preserved for seed, and nothing could be sounder or in better condition. They had been raised whenever the disease appeared; and had they been allowed to remain fourteen days longer, two-thirds would have been rotten, and the remainder affected.

Mr. **Lockhart**, Mr. **M'Meckan**, and all present concurred in confirming the general appearance and progress of the disease, as described by Mr. Harkness.

Mr. **M'Meckan** said it would be better to pass over the cause of the disease, which could not be satisfactorily accounted for in any way, and agree to some practical recommendation.

Mr. JOHN GIBSON said that the appearances which Mr. Harkness had described as observable on the roots and stems of the potato plant during the progress of the disease, corresponded very much with his own observations: but he entertained a different opinion from Mr. Harkness as to the cause of the disease; he believed it to be occasioned by extraordinary atmospheric phenomena, and not by constitutional weakness in the tuber. The chief circumstances which led him to form that opinion were, the universality of the disease, and the simultaneousness of its development, notwithstanding dissimilarity of situation, soil, and methods of cultivation. In moorish districts, on land where the potato had been seldom or perhaps never before cultivated, the disease was as virulent and as general as on lands which had grown potatoes for a long series of years. Its effects were as observable on land that had been richly manured as on land that was in the poorest condition; and in cases in which seed had been imported from foreign countries there was as little exemption from the disease as in those cases in which no change had been made, or even where diseased potatoes had been sown. Thus, then, diversity of culture and of soil was followed by no diversity of effect in the case of the potato; and a change of seed, which is calculated to renovate and strengthen the seed, had no effect in resisting this disease. From the former of these facts he inferred that the cause of the disease was neither in the soil nor in the mode of culture; and from the latter of these facts he inferred that the latent cause was not in the seed, else how did it happen that diseased seed sent up as vigorous stems as sound seed, until the time the general blight came on? Besides, he might adduce the case of early potatoes in gardens. The disease operated simultaneously on them as on the latest field potatoes. If the disease were in the tubers, why did it not develop itself at the same stage in the growth of the former as in that of the latter? The statements that had been made by the meeting were corroborative of each other—first, as to the universality of the disease; secondly, as to the identity of the symptoms and development of the disease; and thirdly, as to the identity of the disease. He therefore considered that, in accounting for the cause of what was everywhere and under every variety of circumstances identical in its effects, we must look for an influence so extensive as to be capable of producing it. That influence he believed to be atmospheric; and if so, it may be asked how it was capable of producing such an effect? The atmosphere had at various periods of the season been charged to an extraordinary extent with electricity, and the meeting was well aware of the *blasting* influence that such an agent had upon vegetation generally; and those who had studied the constitution of the potato plant would agree with him, that the first indication of the disease (the falling off of the leaves, and withering of the stem) was produced by an excess of electricity in the atmosphere. At that time the temperature was unusually high, and there had been some severe thunder-storms. The consequence of the destruction of the leaves upon the potato plant was similar to the destruction of the lungs upon an animal. The important function of respiration being therefore destroyed, there could be no circulation through the leaves and stem of the fluid inhaled by the roots; and the harmonious exercise of this function being at an end, the plant would, according to the universal law of nature, become sickly and die; and its fruit being in an unripe state, and also partaking of bad effects from the sudden derangement and ultimate suspension of its functions, would in all probability rot, unless great attention were given to produce an artificial ripening. Such, he considered, were the natural results of the destruction of the leaves; and the observations which he had made were quite in accordance with these views. The leaves and stems suffered first; the roots continued healthy for a time, until, in the struggle for vitality with the dead stem, the plant became overcharged with fluid, which, from its rot circulating through the leaves, was incapable of contributing either to the healthy increase of the potato or to the healthy condition of the roots themselves. Some were of opinion that the tubers had grown larger after the blackening of the leaves. This, he thought, was quite probable, but the soft and unwholesome condition of the potato showed that any increase was forced and unnatural; but the circumstance tended to strengthen his opinion that the disease proceeded primarily from the atmosphere, and not from the roots, as no increase could have taken place if the roots had been the first seat of the disease. He would just farther add that, in his observations, he had found an average quantity of parent tubers in a fresh condition, without any indications of incipient disease; and this, with the other important facts already mentioned, of the universality of the disease, and the simultaneousness of its attacks, farther justified him in the opinion which he had expressed of the disease being caused by atmospheric influence. If these views be well founded, there need be no apprehension of the potato becoming extinct; and the most important point before the meeting was, to recommend the best method of preserving a quantity of seed for next year, as there was every probability that then we should not experience the same pernicious atmospheric influences as had been experienced this year.

After some further discussion, the Club recommended all having potato crops to plough up the larger portion, to be exposed and greened for seed; and by leaving part in the ground, over winter, to see what effect this would have in resuscitating the potato.

The state of the turnip crop was next taken up, but the consideration of it was deferred till next meeting; and the business being concluded,

Mr. M'Bryde said he had much pleasure in proposing to the meeting a vote of thanks to Lord Stair, for his kindness in attending their meetings, and the enlightened interest he had always taken in agricultural improvements.

Lord Stair said he was proud to preside over such meetings, and felt highly honoured by the kindness of the tenantry of Wigtownshire. He had left them on a recent occasion with deep regret, but was happy in being among them again. The piece of plate which had been lately presented to him, originating from this Club, and subscribed for by so many tenant-farmers, had laid him under a deep debt of gratitude. He sincerely wished them every happiness.

ON THE CULTIVATION OF THE RED CLOVER, AND THE CAUSES OF ITS FAILURE.

BY ROBERT M'TURK, ESQ., of HASTINGS HALL, DUMFRIES-SHIRE.

[Premium, Medium Gold Medal.]

It is a fact well authenticated in the practice of agriculture, that when the same variety of crop has been cultivated on the same field for a number of years consecutively, or even at short intervals, the land ceases to yield the same weight as in the first years of cultivation; and it is upon a knowledge of this fact that a systematic alternation of crops is regarded as essential to every system of good husbandry. When this important principle is neglected, deterioration in the soil invariably ensues, and then its previous fertility can only be restored by a greater expenditure of manure, and a stricter adherence to a well arranged rotation for the future.

With regard to the cause and nature of this deterioration, much difference of opinion has, and does even at the present time, prevail; and men of the highest scientific attainments, who have devoted a portion of their time to its consideration, are nearly equally divided in opinion. The purely practical man readily assents to the truth of deterioration, by adopting such a rotation of crops and system of cultivation as he judges most likely not only to prevent further deterioration, but to maintain the soil of his farm in a state of progressive improvement. Still, he is at a loss to assign a reason, in every respect satisfactory even to himself, as to the necessity for any particular succession of crops.

The red clover may, with propriety, be selected as the crop in which this deterioration has, for many years back, been more apparent than in any other. The observation, however, is not confined to this crop, but is applicable to almost every other in general cultivation.

The question, then, as to the inducing cause of the deterioration in the soil, assumes an aspect of more general importance than the deficiency in the clover crop alone; and its discussion can scarcely fail to throw some light on a subject which seems to be involved in mystery, perhaps the more from the speculative views entertained on it by men whose opinions on other subjects are entitled to the utmost respect. Before proceeding to adduce the results of our own experience, it may not be out of place to state here, shortly but generally, the theories which have been advanced by two parties, who both think they see, in the views they entertain, a satisfactory explanation of a difficulty so intimately connected with the fruitfulness of the soil.

First, then, one party maintains that the necessity for an alternation of crops is owing to a function exercised by plants, by means of which they excrete or discharge from their roots such substances as they do not require or cannot assimilate, and that the substances so excreted deteriorate or unfit the soil, for a time, for the healthy growth of plants of the same variety; but although unfitted for the growth of plants of the same variety, others of a different kind will, in these excretions, find the means of nourishment; and, when appropriated by them, the soil will again be restored to its original fertility. Hence, the evident necessity for a rotation of crops.

Another cause for the diminished fertility of the soil is assigned, and we think more justly, by the other party, that after repeated cultivation of the same variety of plants, the soil, to a certain extent, becomes exhausted of those substances upon which those kinds of plants chiefly depend for nourishment, and which are essential to the full development of their parts. Both views have their advocates, and have been ably supported.

The experiments of Becquerel and Matiucci,* with regard to the appearance of acetic acid in the soil after the growth of barley, where it did not previously exist, may be regarded as the groundwork of the theory of radical excretions. It was first broached by Bergmann, and afterwards warmly supported by Decandolle,† as sufficiently accounting for the necessity of a systematic rotation of crops in the practice of agriculture.

The experiments of Macaire Princep,‡ and the subsequent observations of Neitner, seem to have led them to adopt the same views. Liebig sees in the theory of Decandolle, and in the experiments of Macaire, a satisfactory explanation of the advantage (in an agricultural point of view) arising from a regular alternation of crops. "Of all the views," says Liebig, "which have been adopted regarding the cause of the favourable effects of the alternation of crops, that proposed by M. Decandolle deserves to be mentioned, as resting upon a firm basis."|| In illustration of the same doctrine, he also says, "In some neighbourhoods, clover will not thrive till the sixth year; in others, not till the twelfth; flax, in the second or third year."

All this depends upon the chemical nature of the soil; for it has been found by experience, that in those districts where the intervals at which the same plants can be cultivated with advantage are very long, the time cannot be shortened even by the use of the most powerful manures. The destruction of the peculiar excrement of one crop, must be effected before the production of a new crop.§ The same views are also entertained by Macaire, Neitner, and other physiologists of distinction. Braconnet, by a series of experiments similar to those of Macaire, has arrived at a very different conclusion, and has also endeavoured to point out the fallacy by which Macaire, in his experiments, was misled, and indeed furnishes us with such an explanation of the phenomena exhibited by these experiments, as would seem to show that the root does not possess the power of excreting matter, or at all events, in sufficient quantity to affect the growth of plants of the same variety. So late as 1842, Mr. Gyde, Painswick, Gloucestershire, received a premium from the Highland and Agricultural Society, for a paper on this very subject.

Mr. Gyde's experiments seem to have been conducted with as much attention to accuracy as any of those to which we have previously alluded; and if they are conclusive as to the fact that plants do possess the power of excreting matter from their roots, they are equally so as to the innocuous nature of these substances under the particular circumstances in which they are produced.

The following are Mr. Gyde's conclusions:—

1st. That most plants impart to water certain soluble substances or excretions.

2nd. That this is identical with the sap of the plants.

3rd. That plants have no power of selection, but take into their texture any solution offered to their roots; and that they have little or no power of again excreting it.

4th. That plants watered with their own excretions receive no injury from them.

With regard to the second of these, we did not find that the excretions were soluble in water. On the contrary, we found that the matter which we regarded as an excretion was quite insoluble for a time after it was excreted in water, at the ordinary temperature of the soil; that it was of greater specific gravity than the water; and that it adhered for some days to the part of the root from which it was excreted, till it accumulated in sufficient abundance for its own weight to carry it to the bottom of the vessel. We also found that this matter was formed in greater quantity on the newest part of the root, the older having ceased to excrete, but still continuing to infuse as much of its substance into the water, as to impart its peculiar smell and flavour. But this will also happen if any portion of the stem or leaf of a plant is immersed in water, even when the roots are in another vessel. We found that the matter thus communicated to the water possessed more of the characteristics of the true sap, than the flocculent and insoluble matter excreted from the roots.

As to the third conclusion, we readily admit that when plants are placed in water holding in solution any deleterious substance, they do not seem to possess the power of separating the water from the poisonous matter, and both are received into their system; but it is also true, that if a plant is so placed as to stand equally upon two kinds of soil—the one consisting of barren but at the same time permeable till, and the other of good soil, rich in manure—both divisions of the roots will, in the course of time, leave the barren soil, and take entire possession of the fertile; and further, when compost or soil particularly rich is placed on the surface above the roots, a portion of these, in various plants, will forsake their downward course, and rise up to occupy the compost above the surface.

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* Ann. de Chim. et de Phy. xlv. p. 310.
† Edin. Phil. Journal, 1833, vol. xiv.
‡ Ann. de Chim. et de Phy. lii. p. 225.
|| Agric. Chem., p. 152 and 157.
§ Ann. de Chim. et de Phy. lxxii. p. 27.

We quite agree with the fourth deduction, that plants receive no injury when watered with their own excretions. Indeed, it accords entirely with one of the best established truths in vegetable nutrition; viz., that no substance can be received by the spongioles of the roots, unless first dissolved in water. For if the matter excreted is really soluble, and is identical with the sap, as stated by Mr. Gyde, it is then food in a higher state of assimilation than any plant under ordinary circumstances can meet with in the soil. No wonder, then, that the plants to which Mr. Gyde applied the water containing the excretions grew more vigorously than the other plants, the food of which had received no previous elaboration. More than enough, however, has already been said with regard to a doctrine which we believe has only tended to mislead inquirers from the path in which truth is to be found, and for the refutation of which we shall only at present advance one argument, for the truth of which we can appeal to the experience of every cultivator of the soil.

The power possessed, or supposed to be possessed, by plants, of discharging from their roots what they do not seem to require, is regarded by all the advocates of the theory of radical excretion, and uniformly represented by them, as a healthy function, one with which the thriving of the plant is connected; and, by some who have adopted these views, as scarcely less essential to their health than the analogous functions are to the well-being of the animal system.

Now, it is a truth to which there are few exceptions, that all healthy functions are exercised in animals and vegetables, with a degree of regularity and vigour in proportion to the health of the animal, or the luxuriance of the plant. For example, can it for a moment be supposed that any plant can be in a less healthy condition when the leaves are exhaling oxygen by day, and carbonic acid by night, and when the flower is perfuming the air with its fragrance, than when these functions have ceased? No: these are indications of health; and if the roots do excrete, as our own experience tells us they do, the excretion must be produced in quantities proportionate to the luxuriant state of the plant. Is it not, then, a fact well known to every practical man, that his crops grow more luxuriantly, and yield him a more abundant return for his labour, on a fertile soil than on one of a less fruitful character? that the same description of crop can be produced in a healthy condition, for a greater number of years in succession, in a rich than in a poor soil? In some of the new and rich soils of America, it was no uncommon thing for the first cultivators to take twenty crops of wheat in succession, often many more; and there are instances on record of a hundred being taken in the state of Virginia. In the memory of men with whom we have conversed, ten crops of oats have been taken in immediate succession from land with which we are well acquainted. Now, were it true that the substances excreted from the roots were of a poisonous or injurious nature, it is clear that in the soils in which plants grow most vigorously, these substances would be produced in the greatest abundance, and, consequently, that a good and fertile soil would sooner be poisoned or unfitted for the growth of plants of the same variety, than one of an inferior quality. Can any doctrine, then, be more thoroughly at variance with truth and our every-day experience, than that the necessity for a systematic rotation of crops should be owing to the injurious nature of the substances excreted from the roots of the plants which we cultivate?

We have been more desirous of producing these views, since the red clover is constantly selected as an illustration of the doctrine which we have been combating, as one of the crops the excretion of which requires a longer time to be decomposed and removed from the soil than any other. To what, then, are we to attribute the failure of this crop, which for many years, in some districts, has been so apparent, that other agricultural associations, as well as the Highland and Agricultural Society of Scotland, have regarded it as an object worthy of investigation?

The Rev. W. Thorp, Warmsley, near Pontefract, in a paper in the third volume of the "Journal of the Royal Agricultural Society of England," imputes the failure wholly "*to a want of a certain degree of cohesiveness in the particles of the soil.*" Hence the soil's power of retaining heat is diminished; and all plants, particularly clover, which are impatient of sudden changes of temperature, are thus easily destroyed by the frost.

While we are quite satisfied, from our own observations, that many clover plants are destroyed by the occasional severity of the frost in winter, we cannot agree with Mr. Thorp in thinking that this is wholly owing to the want of cohesiveness or solidity in the soil. If we look, however, a little more closely into the theory of the cohesiveness of the soil, as tending to afford a greater degree of protection from frost (for his whole argument resolves itself into that, as the means by which the failure of the crop is to be prevented), this greater degree of protection cannot be applied to any part of the plant with so much advantage as to that which is most liable to be affected, and in which, according to Mr. Thorp, the injury always first makes its appearance. He says, "The first part injured is the neck of the plant (collet), about a quarter of an inch below the part where the leaves first join the stem."

How far, then, are the means recommended likely to promote the adhesiveness of the soil, and likely to afford protection against severe frost? for it is only when the weather can be regarded as such that clover plants are injured. Mr. Thorp tells us that eating off the turnip crop with sheep will give the necessary degree of solidity; that the turning of the horses upon the end ridges will also impart solidity to them; that the Duke of Portland found that land manured with bones was not sufficiently solid, but that the same, when manured with farm-yard dung, was adhesive enough; that if stubble land is simply scratched with a light harrow before sowing the seed, and afterwards compressed with a heavy roller, it will stand the winter. There are various other expedients recommended by the rev. gentleman, which are not generally under the command of every person, but none of which are regarded as of more importance than those already mentioned. It would, indeed, be a most important advantage if sheep, in addition to the benefit which they otherwise convey to the land when consuming the green crop upon it (now that the practice is become so general), were also to ensure a good crop of red clover for the two following seasons.

But we cannot think that it was in consequence of the treading of the sheep merely, in the instances to which Mr. Thorp alludes, that the abundant crops were to be attributed. We find a much more satisfactory cause in the manure which they left upon the ground. In one field to which we devoted much attention, the turnip crop of which was eaten down with sheep, and through which we had occasion to cart a quantity of stones and other articles, the clover crop afterwards was a complete failure, except on one ridge next to a dyke which sheltered it from the west, the direction in which the field was most exposed to wind and rain, and to which the sheep had constant recourse for shelter when the weather was unfavourable. This ridge, from the quantity of rain that fell at the time, was certainly not more consolidated than the end ridges on which the turnings were made, or the part over which the road passed; still the crop in those parts seemed to derive no advantage from the compression which they had received, and it was only upon the ridge on which a much larger proportion of dung and urine had been deposited that the clover could not be regarded as a failure.

We adduce this instance, not only as a case in point, but as coinciding with what may be regarded as the general experience on this subject of the district in which we reside.

It is true that lime, and more especially in a caustic state, by the decomposition which it promotes in the soil, does to a certain extent render it more porous, but certainly not more so than farm-yard manure, the action of which, in the state in which it is generally used, is much more active than lime, and bones are less active than either.

As to the other expedient to which we have referred—namely, sowing the clover after the oat or barley crop has been cut, first harrowing the surface, and afterwards rolling in the seeds—we have only to say, that in portions of our fields where the crop has been lodged, and the grass seeds destroyed, we have tried the plan recommended; but the experiment was not attended with that success which would warrant us in advising others to have recourse to it, unless on such parts as we refer to, and which would otherwise produce nothing. On such occasions the seed always germinated well, and showed a thriving *braird*; but the plants were sure to give way, particularly the red clover, when frost commenced. In some instances the clover was destroyed before the frost commenced; for young braird at that season of the year is very palatable to every kind of stock, and is, on that account, sure to be cropped by every kind of stock on the ground; and when once stripped of its leaves, so tender a plant is nipped by the first frost. The recommendation to substitute a young and tender plant for one older and more hardy, when tenderness is regarded as the cause of the failure, seems to us a very extraordinary cure for the disease. It does not alter the case that rolling is also recommended; for, if that operation is to be regarded as beneficial, the older plants can be as easily rolled as the younger, besides a greater degree of solidity preserved to the soil than when it has been loosened by harrowing. In so far as protection to the neck of the plant is concerned (and this seems to be all that is considered necessary), it is evident that solidity cannot be maintained through winter, in any soil that contains more moisture than is essential for the purposes of vegetation; for every frost that penetrates the soil to the depth of one inch must completely destroy the solidity which either the treading of sheep or rolling can effect. Besides, Mr. Thorp seems to forget that the solidity imparted by the first of these means must be completely destroyed, for two or three inches upon the surface, by the subsequent operations of ploughing and harrowing in the seeds in the following spring.

It now remains for us to show that there are various causes which have all more or less influence in occasioning the failure of the clover plant, and to endeavour to point out the means by which the evil may be remedied.

When we ascertain the composition of any plant, we will find that the proportions of its organic and inorganic constituents are in many respects different from every other plant, however nearly allied it may be to them all, and that even the different parts of the same plant contain those same constituents in different proportions. In so far as the inorganic constituents are concerned, there is no source from which they can be derived in sufficient abundance but the soil; and as these substances are found to exist in the soil in very unequal quantities, there is no doubt but that, while one kind of plant is withdrawing one substance in greater amount, another is appropriating another substance in a larger degree; and so it is with every crop. It is therefore evident that, unless these substances are restored in quantities equal to what have been abstracted, the soil must in course of time be exhausted. It is also evident that, while some of these substances readily accumulate in sufficient abundance from the decomposition of matter which is continually taking place, others are very slowly restored, and some scarcely at all, unless when contained in the manure which is from time to time applied. It may be observed that, in the course of the ordinary operations of husbandry, some of the more soluble of these substances may be carried down by the rain into the soil, while in a pulverized state, in greater abundance than they are produced by natural causes, to a depth to which the roots do not extend. Under these circumstances, it is not to be wondered at that the soil should be sooner unfitted for the growth of some crops than for others; and especially for those crops which require a larger amount of those substances which, in the first instance, exist in the soil in more limited quantities, or which are more soluble, and carried away by rain to a depth beyond the reach of their roots.* This is, perhaps, more the case with red clover than any other plant, which will be more apparent when we avail ourselves of the aid that chemistry affords. It tells us, in the first place, that 1,000lbs. of red clover, in the dried state, according to the analysis of Sprengel, contain the following proportions of inorganic matter :—

Potash	19.95
Soda	5.29
Lime	27.80
Magnesia	3.33
Alumina	0.14
Silica	3.61
Sulphuric acid	4.47
Phosphoric acid	6.57
Chlorine	3.62
	74.78

From this analysis we learn the very large proportion of potash which red clover abstracts from the soil, when contrasted with the other crops with which it is generally associated in the course of a regular rotation.

Wheat contains in 1,000 lbs. of the grain	2.25	Straw 1,000 lbs.	2.45
Barley	2.27	—	1.80
Oats	1.50	—	8.70
Rye-grass hay	—	—	8.81

If we allow that the straw is double the weight of the grain, then in 1,000 lbs.

Of wheat there is only	0.89	of potash.
Of barley	2.13	—
Of oats	6.30	—

Thus we see that 1,000 lbs. of red clover requires nearly as much potash as is contained in twenty times the same amount of wheat, eight times the amount of barley, and three times the amount of oats, and twice of rye-grass, the very crops which are made to form part of the rotation along with it.*

Besides, potash is one of those substances which has a strong affinity for water, and is, on that account, very soluble in every state of combination in which it is found in the soil; hence its great liability, when the land is under cultivation, to be carried off by rain. This observation, however, applies more to the rain which falls in inland situations, or to those localities which are screened from the sea by some high mountain range; for there is good evidence to show that portions of the various saline substances contained in sea-water, and which contribute so much to the fertility of the soil, are often carried to considerable distances from the shore†. We may further observe, that it is owing to the still greater amount which the different green crops require of inorganic as well as of organic food, that a large application of manures is found to be necessary for their growth, in which case those substances cannot be said to be abstracted from the soil.

Although these remarks are made more particularly in reference to potash, as the substance which, with the exception of lime, enters more largely into the composition of clover than any other, and one which is more apt to be washed from the portions of the soil which is subjected to frequent cultivation, still they are applicable to other inorganic constituents, though many of them are less soluble, and exist often in much larger proportions than potash. This view of the case helps to explain why the red clover crop is less abundant on land which has been frequently cultivated, and why its failure is more perceptible on inland situations, than in those more exposed to the sea. But there are often causes of failure on soils which cannot be said to be deficient in any of the substances essential to the growth of this crop.

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* See Professor Johnston's Lectures on Agricultural Chemistry, p. 265.

* Gypsum has been strongly recommended by Sir Humphry Davy and other writers on agriculture, as a valuable manure for red clover; but we have found that coal, peat, and wood-ashes—particularly the ashes of ash-wood—are much more efficacious. This is chiefly to be attributed to the potash which they contain.

† Liebig's Agricultural Chemistry, pp. 110, 138. And we believe that Dr. Madden, when at Penicuik, had satisfactorily proved, by a series of observations there recently made, that the rain which falls between the sea and the Pentland hills contains more saline substances than the rain which falls beyond that range.

In the spring of 1841 we commenced a series of experiments, with the view of obtaining some information on this subject, and conceived that we were more likely to arrive at the truth by beginning at the germination of the seed, and marking with care the progress which it made in the different stages of its growth. A piece of ground was selected adjoining the house, the soil consisting of a light fresh loam, and as much alike in character as one soil could be. Two rows of boards, eight inches broad, were placed edgeways, parallel with each other, at six feet apart in the ground. The earth was then put in, and equalized between the boards till an inclined plane was formed by it, with a rise of one inch in the foot. The earth was thus level with the upper edge of the south board, and six inches below the upper edge of the north one. This inclined plane, though only six feet wide, was seventy feet in length. Sixty-eight gentle impressions were made upon the mould with the handle of a rake, after the plane was made as smooth and uniform as it could be. In those impressions, the same number of the different kinds of seeds most commonly used in agriculture were sown,* and more earth was then put in till it was level with the upper edge of the boards. The seed sown in this way, had little or no cover of earth at one end of the rows; but the cover gradually increased, till it reached a depth of six inches at the other end. The boards enabled us to make this cover with great accuracy, so that at every part of the rows in which the seed germinated, there was an inch of additional covering of soil for every foot in length; so that by applying the foot rule to the surface, we could ascertain at any time the depth of the seeds, and by assuming the half of the space in which the seeds germinated, that gave the proper depth of covering. The seeds were equally exempted from the risk of germination being prevented by too much cover, and at the same time from being lost, in case of dry weather, from having too little. We thus arrived at what may, with confidence, be regarded as the proper depth at which clover seed should be placed; and of six samples sown in this way, namely, English, French, American, Flemish, Juliers, Sucklings, the average, and therefore the proper, depth, may be stated at one inch.

There is no doubt that seeds will germinate at a greater depth in a light gravelly or sandy soil than in a clayey one; but we consider the soil in which the experiments were made as equally removed from both these extremes, and, in this respect, as of a very fair average for an experiment of the kind.

Having ascertained the depth, we proceeded, in the first week of June in the same year, to find out the proportion of seeds that might be expected to germinate in a given number of medium quality, such as are commonly sold in the shops. Out of 500 seeds sown in rows, at a distance of six inches in the row, 426 germinated; showing a deficiency of nearly 15 per cent. Out of one of Mr. Lawson's best samples of 500 seeds sown, 475 germinated; showing a deficiency of only 5 per cent. This was not the only loss sustained at this stage of their growth, for before they had attained to what might be considered the rough leaf, there was scarcely a plant for every two seeds sown; showing a deficiency of at least 50 per cent. The insect which chiefly committed these depredations was the same that so often destroys the turnip crop; although we cannot say that the slug had no share in them. In these experiments it was not our object to destroy insects, but rather to learn the extent of the ravages which these enemies of agricultural plants are capable of committing. Whether they have been as destructive in former years we have no means of knowing; but it is not unlikely that they, like every other species, may increase with the means of subsistence, and for whose support the extended cultivation of the turnip crop makes ample provision.

From what has been said on this part of the subject, it must be obvious that, even under the most favourable circumstances, much of the seed committed to the soil never attains maturity. When we think of the great disadvantages to which its seeds are exposed in field cultivation, the numberless chinks and crevices in a soil but moderately rough, in which they may be cast, it is not to be wondered at that from this cause alone the expectation of the cultivator should sometimes be disappointed. No clover seed should ever be sown until the soil intended to receive it is made as fine as light and strait-toothed harrows can make it, to fill up the crevices, and only one strake should afterwards be given with them. There is another practice in many districts of Scotland, of eating down young grass with sheep and other stock occasionally, from which much injury is sustained. It is but too common to see the grasses nipped as close to the surface as teeth can reach; and we have often observed clover, by this treatment, nipped over at the neck, which must, in every case where this happens, prove fatal to it; but although it may not have sustained injury to this extent, still it is stripped of its leaves, and these, from the way in which they come out from the stem, and spread around it, are well adapted to afford the required protection to the stem and root. It is true that the leaves themselves are often laid prostrate by the severity of the frost; but this only causes them to fall around the neck, and cling more closely to it. We would not be understood as condemning all pasturing of young grass, for this often proves a great convenience for sheep; and we have invariably found it an unfailing antidote to inflammation of the bowels, or *braxy*—the disease to which young sheep are most subject; but we most decidedly condemn it when carried so far as to deprive the clover of all protection. Upon the same principle, we also regard the practice of mowing the grain crop with which the clover is sown, as very hurtful to the young grasses.

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* For these, we were indebted to the kindness of Mr. Thomas Kennedy, nursery and seedsman, Dumfries.

Having arrived at the knowledge of these facts, with regard to the depth of clover and the depredations of insects, we began in the following spring another set of experiments, at the same time allowing all the clover plants of the previous year to remain in the ground, with the view of watching their future progress. We then set off a piece of ground, 10 feet square, and divided it into equal parts of a foot each; 400 clover seeds were then selected from Mr. Lawson's best sample, one-half of which were of the lighter yellow, and the other half the dark purple-coloured variety; and the yellow was sown in the one-half of the ground, and the purple in the other, to ascertain if there was any difference in their germination or durability in the ground; but in both respects there was scarcely any difference, the yellow, by a few plants, having the advantage in germination. Four of the selected seeds were planted in the centre of each foot of the ground previously laid off, with the intention of insuring one plant in each division; and as soon as the plants were considered out of danger from insects, only one was left in each space. Mostly all were in flower in September; but in this respect there was considerable difference; and all were cut down by the end of the month, that their treatment might be similar to what they would have received if grown with a crop. With the exception of six plants, they all survived the winter, and we believe they were those which were most advanced at the time of cutting, and after which they exhibited but little symptoms of throwing out fresh leaves. In this experiment no manure of any kind was applied, as the object was to obtain a knowledge of the durability of the red clover in the ground, when grown under the most favourable circumstances in regard to space and new soil. The 94 plants which survived the winter grew most luxuriantly in the summer of 1843, some of which brought to perfection fourteen stem-flowers, and none fewer than six, at the beginning of August, at which time one-half were cut down, and the other half allowed to grow to the end of September, much about the time that the second crop attains its maturity, when we found that the plants which had thrown out the greatest number of flower-stems, when cut in August, were deficient in the number of their stems to the plants which were less vigorous at that time. After the September cutting they began to throw out leaves of a more sickly character than they had yet exhibited, but no flower-stems. Not more than nine plants survived the winter; and the only indication of their having done so was but a few sickly leaves, which made their appearance in April, 1844, after which they died.

It appears from this experiment, and also from the duration of the plants of the first experiment in which we tried to find out the proper depth of cover, that all the different varieties of red clover generally cultivated in this country, whether the seed is from Holland, America, or any other quarter, are biennial, instead of perennial, as they are often represented to be. It is true that we often find plants of red clover, in fields which have been sown out with it, years afterwards; but these have arisen from seeds which were placed under circumstances unfavourable to germination. As, for example, besides a sufficient depth of earth, stones are often pressed down with the roller upon the top of seeds, the air excluded, and germination for a time prevented. Next spring the stones are taken away on account of the hay-cutting, or they are turned over by sheep in winter, when this obstacle to germination is removed; but instead of in the first spring, this change in circumstances might take place at any future period, and the seed will spring up then, if it has not lost its vitality. Besides, there is a variety of red clover which is perennial, and indigenous to many soils of this country, more especially the drier parts of meadow land which have not been ploughed; but the seed of this variety is not commonly sold in the shops.

Much about this time our attention was particularly directed to the improvements of Franc

Maxwell, Esq., of Gribton, a gentleman in this neighbourhood, who, several years before, had commenced spade-trenching and thorough-draining on a very extensive scale. He had completed seven or eight fields of large extent, but of the worst quality on his estate, with thorough-draining and spade-trenching fifteen inches deep. We had almost constant opportunities of seeing the same fields for more than twenty years before these improvements were commenced. None of them were worth more than twelve shillings per acre, exclusive of the local advantage which they possessed; and others were of the very worst description of land in the country. They had at first been broken out of thin moor, with a cold and retentive tilly subsoil. The crops which they had yielded were very scanty, such as might be expected from such land. The clover never deserved the name of a crop. The fields had been limed in the first stage of their cultivation, and also slightly after being trenched. The rotation of crops taken after the improvements was first oats, then potatoes or turnips, then barley or oats, all of fair quality, and at the same time sown out with rye-grass, and red and white clover. The healthiness of the red clover, on some of the fields, was very evident after the grain crop was cut, and also in the rye-grass hay; but the after-crop of the clover in October seemed one solid mass, and in several parts was completely lodged. These improvements on a large scale coincided with some experiments we had been making on a small one. That land which has been frequently cultivated, and which has become clover-sick, may be benefited by deepening the soil, and bringing a portion of those substances to the surface, of which it is either exhausted by the repeated cultivation of the clover, or which have been carried down by rain, is a fact every day receiving the additional testimony of those who have had recourse to subsoiling; and although the advantages of such operations are very evident on other crops, on none is it more so than red clover.

It may now be proper to show how the alkalies are restored to the soil, when rest or pasturage is substituted for cultivation. All soils consist of disintegrated rock; and whether these changes may have been, in the first instance, produced by some mighty cause, which produced more immediate results than we see in operation at the present time, agents are still constantly at work in the atmospheric changes of heat and cold, wet and dry, which are not less capable of accomplishing the disintegration of the hardest materials of which the globe is composed, and, in course of time, their decomposition also. By marking the operation of these agents we learn the process by which the alkaline bases are made to form part of the soil, and the various saline combinations into which they are enabled to enter. Rocks of every formation contain some one or other of the alkalies, and often more than one, according to Liebig. Feldspar contains not less than 17 per cent. of potash; albite 11 per cent. of soda; zeolite 13 per cent. of both alkalies taken together; granite, graywacke, porphyry, basalt, clay-slate, clinkstone, sandstone, lime, lava-loam, contain each their certain proportions; and the decomposition of any one of these rocks must always restore to the soil one or more of the alkalies. In the course of cultivation, there is always a constant breaking down of the materials of the soil, to which the tear and wear of the iron implements employed bear ample testimony; and although portions of the stones (fragments of the different rocks) of which they consist are in this way pulverized, still they supply no new food for the succeeding crops until they have been decomposed, and rendered soluble—changes which will then be more speedily effected, and the alkalies restored in greater abundance, than required for the purposes of pasturage. Carbon, azote, and the elements of water, which in different proportions unite to form so many of our most valuable animal and vegetable substances, and which are equally essential, are derived from other sources which can be more readily supplied to the soil; but until of late years, when science began to lend her aid to agriculture, the application of the alkalies (with the exception of lime), as necessary constituents of every fruitful soil, formed no part of the practice of agriculture; and it is only when these substances are exhausted that a soil is reduced to the sterile condition alluded to by Liebig, when he says, that "no quantity of manure could fertilize it for the production of certain crops;" and not, as he attributes it, to the injurious nature of the substances excreted from the roots.*

In these observations we have pointed out the causes to which the failure of the red clover crop is chiefly to be attributed, and shall now, in conclusion, shortly advert to what has been advanced on that subject, as well as on the remedies suggested.

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* Although Liebig gives the countenance to the doctrine of radical excretion, which we have previously quoted, there is scarcely a chapter in his "Chemistry of Agriculture," in which he does not, in one shape or another, recognize the truth which we have here stated. "It must be admitted (he says) as a principle of agriculture, that those substances which have been removed from a soil must be restored to it; but whether by means of excrement, ashes, or bones, is in a great measure a matter of indifference."

Professor Johnston, in his Lectures on Agricultural Chemistry, has established the same important truth upon a foundation from which it can never be removed.

1st. We see, then, that much seed is lost from falling into chinks and crevices; and that even in certain conditions of the soil, with the common harrow, so much cover may be given to the seed as to prevent its germination. This is more particularly the case when the soil is rough or damp, or of a heavy and impervious character. Clover seed can scarcely be sown in such descriptions of soil without more than one half of it receiving from two to three inches of cover, and, when rolled, it is entirely lost. It would be much better under such circumstances to sow the clover seed after the harrowing has been finished, and simply to roll afterwards, and in this way rather to risk the chances of its being destroyed by an over dry summer: the chances are at least three to one in its favour, the circumstances favourable to the growth of red clover being a dry or well pulverized soil, and not more than one inch of cover.

2nd. It is also evident that a very large proportion of the plants in the first stage of their growth are liable to be destroyed by insects and slugs. At the present time we are aware of no remedy of general application for the evil but to sow less sparingly. In many districts the neglect of this precaution is too common an error. The quantity allowed in some is from 4 to 6 lbs., in others from 6 to 10, and in some of the finer lands still more. Suppose then that in the first of these 5 lbs. are given to the imperial acre of seed of average quality;* this is only one seed to every ten square inches; and if we deduct one half for the loss sustained in germination and by insects, we have only one seed for every twenty square inches. We also found that 5 per cent. was lost by frost, which will also make the distance still greater; and if we take the acre of Scotch measure, by which the soil is still calculated in many parts of this country, we shall have a space of nearly twenty-eight square inches around each plant.

3rd. Before clover can be successfully cultivated on wet, or even damp land, it must be drained; first, because clover delights in a dry soil; and secondly, when the frost expands the moist soil in contact with the neck of the plant, it is left bare after the thaw arrives, and is therefore more liable to be destroyed by the next frost.

4th. If clover is too closely cut down, it is left without the leaves, its natural protection; and if the frost is afterwards severe, it is sure to be destroyed.

5th. Mowing is objectionable to a certain extent, for the same reason. When the crop is cut with the sickle, a larger amount of stubble and foliage are left upon the ground for protection.

6th. These precautions are necessary to have a sufficient number of plants in the ground in spring; but it is clear that the future crop must also depend on the amount of the proper nourishment contained in the soil, and the facility with which it can be appropriated by the plants in every stage of their growth; for if stinted before the tillering commences, fewer stems will be thrown out, sometimes only two or three, and often when food is more plentiful, as many as a dozen, and all of them more luxuriant. From this cause the crop may either be one-fourth the weight or four times that amount, as was well illustrated in the case of Mr. Maxwell of Gribton's crop, which had not received more than 3 lbs. of seed to the acre; but from the improvement which he had effected, nourishment of every kind was abundant; and the extraordinary manner in which the plants tillered in consequence furnishes us with a satisfactory explanation as to the uncommon weight of crop from so small a quantity of seed.

7th. It must also be evident that the practice of eating down the second crop with sheep must have a much greater tendency to maintain the soil in a favourable condition for the growth of clover, than when the practice of carrying it off the land to be consumed was more generally prevalent.

8th. We recommend with very much confidence thorough-draining and trench-ploughing, as the most efficacious remedies which can be resorted to for restoring to its original fertility land which has become clover-sick.—Journal of Agriculture.

IMPORTATION OF GUANO.—Application having been recently made to the customs' authorities by the proprietor of a sufferance wharf on the banks of the river, requesting that guano might be permitted to be landed at his wharf, the request has been granted, and their sanction given for the article to be landed and deposited at all first-class sufferance wharfs from the present time. This description of merchandise is now classed among the list of articles which are free of duty on importation into this country; but, as is the case with respect to all free goods, accounts are still required to be taken of the quantity imported, for official purposes. Several applications have lately been made by parties, requesting that their cargoes of guano in bulk might be delivered without undergoing the process of landing, and being weighed over the ship's side, in order to save unnecessary expense to the importers in regard to an article to which no duty attaches, and which offers no opportunity for concealment or otherwise defrauding the revenue; and the same has been permitted in each instance, the invoice weights being supplied by the importers, for the purpose of making the official revenue returns.

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* Supposing that there are 130 seeds in five grains, or 15,362 to the ounce.

ANALYSES OF THE MINERAL INGREDIENTS OF THE HOP.

BY J. C. NESBIT, F.G.S., M.C.S.L., ETC., OF THE AGRICULTURAL AND SCIENTIFIC SCHOOL, KENNINGTON, NEAR LONDON.

The hop, which is extensively cultivated in many parts of England, is well known as being employed to give a proper flavour to malt liquors, and to prevent them from running too quickly into acetous fermentation.

This plant (the *Humulus lupulus* of Linnæus) belongs to the natural order Urticaceæ—the same order which includes, among others, the common nettle and the hemp.

It is a diœcious plant; some plants bearing male flowers, and others female flowers, The female flowers of the plant constitute the hops. The male hop is known in Kent as the wild hop or the blind hop, and is very generally eradicated from the hop-gardens, because its small flowers so soon wither away: they wither only, however, after having prepared the pollen necessary to impregnate the female flowers. It has been found by experience very beneficial to encourage the growth of the wild hop in the vicinity of the hop plantations, as when the female flowers are impregnated with the pollen from the males, they become much larger and furnish a greater weight of hops, of a more powerful bitter and more agreeable flavour.

The cultivation of the hop is one of the most important items in farming, in Kent, Sussex, and parts of Surrey, Hampshire, Herefordshire, and Worcestershire; and requires at the same time a greater capital per acre than any other crop. It seems, therefore, a matter of some surprise that no one has hitherto engaged in the analysis of the ashes of this plant, in order to discover the quality and weight of the mineral ingredients removed from the soil by the hop.

It is well known to all hop farmers, that hops require more manure for their proper development than any other plant which they cultivate.

Being anxious, if possible, to render the cultivation of this plant less expensive, I undertook the analysis in our laboratory, of the mineral ingredient of the hop, of two varieties, and grown upon widely different geological formations. The first samples analysed were the produce of four hills of the Golding hop, kindly furnished me by John M. Paine, Esq., of Farnham. Farnham itself is peculiarly situated just at the juncture of the tertiary, chalk, and upper and lower green-sand formations.

The land upon which these hops were grown has been long under cultivation. There is an artificial vegetable mould of about two feet in depth, resting upon a stratum of loam, mixed with marl rubble, below which is the upper green-sand or fire-stone of geologists. This is an excellent stone for building; and between the interstices of the stones to a great depth, the finely comminuted portions of the upper soil appear to have been washed from time to time, and in their crevices the roots of the hop are always found to grow with much luxuriance.

Nearly the whole of the best description of hop-land at Farnham is of the above description.

THE GOLDING HOP.

These hops were picked in September, 1845; and, together with the leaves and bine, were sent to me in the latter end of that month. The hops of the four hills, dried, weighed 2 lbs.; the dried leaves, 9⅜ oz.; and the dried bine, 1 lb. 2½ oz.

1. *Analysis of the Ashes of the Hop.**

The 2 lbs. of hops, when dried at a steam heat, lost 3 oz. of moisture, and left 1lb. 13 oz. of dry hops.

The dry hops were burned to ashes in a large earthen crucible, and furnished 1282 grs. of ashes, being at the rate of 9 9/10 per cent. These ashes were analyzed in the usual manner, and every hundred parts contained as follows:—

Ashes of the Hop.

Silica (or pure sand)	20·95
Chloride of sodium (common salt)	7·05
Chloride of potassium	1·63
Potash	24·50
Lime	15.56
Magnesia	5·63
Sulphuric acid (oil of vitriol)	5·27
Phosphoric acid	9·54
Phosphate of iron	7·26
Carbonic acid	2·61
	100·00

2.—*Analysis of the Ashes of the Leaves of the Hop Plant.*

The 9⅜ oz. of leaves, dried at a steam heat, lost 1⅛ oz. of moisture, and left 8¼ oz. of dried leaves.

The dried leaves, burned to ashes as before, gave 572 grs., being at the rate of 16⅓ per cent.

The ashes were of the following composition in the hundred parts:—

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* In the following tables the loss is previously deducted.

Ashes of the Leaves of the Hop plant.

Silica	10·14
Chloride of sodium (common salt)	7·92
Soda	0·32
Potash	12·48
Lime	41·46
Magnesia	1.99
Sulphuric acid	4.20
Phosphoric acid	2·02
Phosphate of iron	2·93
Carbonic acid	16·54
	100·00

3. *Analysis of the Ashes of the Hop Bine or Stalk.*

The 1lb. 2½ oz. of the bine, dried at a steam heat, lost 1⅞ oz. of moisture, and left 1lb. 0⅝ oz. of dry bine.

The dry bine burned gave 353 grs. of ashes, being at the rate of nearly 5 per cent.

The ashes gave the following results in the hundred parts :—

Ashes of the Bine of the Hop.

Silica	4·64
Chloride of sodium (common salt)	4·95
Chloride of potassium	7·38
Potash	18·62
Lime	29·59
Magnesia	3·15
Sulphuric acid	2·63
Phosphoric acid	5·22
Phosphate of iron	0·31
Carbonic acid	23·51
	100·00

4. *Composition and per centage of the Ashes separated from the Carbonic Acid.*

The carbonic acid combined with the lime, &c., in the ashes, was produced during the burning of the plant, by the oxidation of the carbon of the vegetable matter.

It is therefore not a mineral ingredient of the soil; and in order to arrive at the real per centage of inorganic matter, it is necessary to withdraw the carbonic acid from the foregoing tables. This has been done in the following tables :—

TABLE 1.—Quantity per cent. of Mineral Ingredients in the Hop, Leaves of Hop, and Bine, dried at the temperature of boiling water.

	Hop.	Leaves.	Bine.
Per cent	9·87	13·6	3.74

TABLE 2.—Composition in one hundred parts of the Inorganic Matter.

	Hop.	Leaves.	Bine.
Silica	21.50	12.14	6.07
Chloride of sodium	7.24	9.49	6.47
Chloride of potassium	1.67	..	9.64
Soda	..	0.39	..
Potash	25.18	14.95	24.35
Lime	15.98	49.67	38.73
Magnesia	5.77	2.39	4.10
Sulphuric acid	5.41	5.04	3.44
Phosphoric acid	9.80	2.42	6.80
Phosphate of iron	7.45	3.51	0.40
	100.00	100.00	100.00

5. *Quantity of Inorganic Matter taken from the Land by Four Hills of Farnham Hops.*

In order to obtain practical benefit from the foregoing analyses, it will be necessary, in the next place, to ascertain the whole amount of inorganic matter removed by the four hills of hops, and likewise the amounts of the separate ingredients.

The following table gives us the actual weight, in *grains Troy*, of the various ingredients removed from the soil by four hills of hops :

Actual Weight of Mineral Ingredients removed from the Soil by Four Hills of Hops.

	Hops.	Leaves.	Bine.
Silica	268.11	59.24	16.63
Chloride of sodium	90.28	46.31	17.73
Chloride of potassium	20.82	..	26.41
Soda	..	1.90	..
Potash	314.00	72.96	66.72
Lime	199.27	242.39	106.12
Magnesia	71.95	11.66	11.23
Sulphuric acid	67.46	24.60	9.43
Phosphoric acid	122.21	11.81	18.63
Phosphate of iron	92.90	17.13	1.10
Total weight	1247.00	488.00	274.00

6. *Amount of Mineral Ingredients removed from the Soil by an Acre of Hops.*

The number of hills of hops to an acre varies in different localities. In some places 1000, in others 1260, in others 1440 hills go to the acre.

In the present instance I believe about 1000 to be the number of hills contained in an acre.

Therefore, by multiplying the numbers in the preceding table by 250, we shall have the actual weights of the various inorganic ingredients of the soil removed from an acre of land by the hop.

For the convenience of agriculturists, I give in the following table these weights in pounds and ounces avoirdupois.

Amount of various Mineral Ingredients removed from an Acre of Land by the Farnham Hop.

	500 lbs. of hops.		146½ lbs. of leaves.		289 lbs. of bine.		Total in hops, leaves, and bine.	
	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.
Silica	9	9	2	2	0	9½	12	4½
Chloride of sodium	3	3½	1	10	0	10	5	7½
Chloride of potassium	0	12	0	0	0	15	1	11
Soda	0	0	0	1	0	0	0	1
Potash	11	3½	2	10	2	6	16	3½
Lime	7	1¼	8	10	3	13	19	8¼
Magnesia	2	9	0	6	0	6½	3	5½
Sulphuric acid	2	6¾	0	14	0	5¼	3	10
Phosphoric acid	4	6	0	7	0	9½	5	6½
Phosphate of iron	3	5	0	10	0	0¾	3	15¾
Sum total	44	8	17	6	9	11½	71	9½

THE YELLOW GRAPE HOP.

The grape hop is of a different species to the Golding, and generally produces a greater amount of crop per acre. These hops were sent by Mr. Kipping, of Hadlow, Kent, and were grown on the weald clay, on a soil manured almost to the fullest extent that the land would bear. Occasionally from 25 cwt. to 30 cwt. per acre of hops have been grown on the same land. The following analyses were performed, at my own request, in our laboratory, by my pupil, Mr. James Allen, of Howberry, near Dartford, Kent.

The hops were picked in September, 1845. They weighed 4lb. 2 oz.; the leaves 14½ oz.; and the bine 2 lbs. 12 oz.

Analysis of the Ashes of the Grape Hop.

The 4 lbs. 2 oz. of hops, when dried at a steam heat, lost nearly 11½ oz. of moisture, and left 3lb. 6½ oz. of dry hops.

The dry hops burned to ashes furnished 4649 grs., being at the rate of 19.4 per cent.

These ashes on analysis gave as follows :—

Silica (or pure sand)	20·40
Chloride of sodium (common salt)	2·60
Chloride of potassium	1·80
Potash	15·20
Lime	19·40
Magnesia	5·00
Sulphuric acid (oil of vitriol)	3·40
Phosphoric acid	4.30
Phosphate of iron	5·55
Carbonic acid	2·75
Manganese	1·30
Sand and charcoal	16·40
Loss*	1·9

Analysis of the Grape Hop, with the Sand, Charcoal, and loss deducted. Per centage of Ash, 15·8.

Silica (or pure sand)	24·96
Chloride of sodium (common salt)	3·18
Chloride of potassium	2·21
Potash	18·61
Lime	23·75
Magnesia	6·13
Sulphuric acid (oil of vitriol)	4·16
Phosphoric acid	5·26
Phosphate of iron	6·79
Carbonic acid	3·36
Manganese	1·59

Analysis of the Ashes of the Leaves of the Grape Hop.

The 14½ oz. of leaves, dried at a steam-heat, lost 1$\frac{9}{10}$ oz. of moisture, and left 12$\frac{6}{10}$ oz. of dried leaves.

The dried leaves, burned to ashes as before, gave 1475 grs. of mineral matter, being at the rate of 26·8 per cent.

The ashes were of the following composition in the hundred parts :—

	grs.
Silica (or pure sand)	19·00
Chloride of sodium (common salt)	4·30
Soda	2·15
Potash	4·80
Lime	30·25
Magnesia	5·85
Sulphuric acid (oil of vitriol)	3·40
Phosphoric acid	3·45
Phosphate of iron	0·50
Carbonic acid	20·00
Sand and charcoal	5·25
Loss	1·05

Analysis of the Leaves of the Grape Hop, with Sand, Charcoal, and Loss deducted. Per centage of ash, 25·11.

Silica (or pure sand)	20·38
Chloride of sodium (common salt)	4·58
Soda	2·29
Potash	5·13
Lime	32·28
Magnesia	6·24
Sulphuric acid (oil of vitriol)	3.63
Phosphoric acid	3·68
Phosphate of iron	0·54
Carbonic acid	21·25

Analysis of the Bine or Stalk of the Grape Hop.

The 2 lb. 12 oz. of bine, dried at a steam heat, lost 4⅗ oz. of moisture, leaving 2 lb. 7⅖ oz. of dry bine.

The dried bine burnt gave 918 grs. of ash, being at the rate of 5·3 grs. per cent.

The ashes gave the following results in 100 parts :—

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* Fluorine was detected in the ashes of both samples of the hop.—J. C. N.

Silica (or pure sand)	5·50
Chloride of sodium (common salt)	9·70
Soda	2·25
Potash	12·60
Lime	16·90
Magnesia	12·25
Sulphuric acid	3·05
Phosphoric acid	7·90
Phosphate of iron	2·00
Phosphate of alumina	1·50
Carbonic acid	23.50
Charcoal	2·00
Manganese	a trace
Loss	0·85

Analysis of the Bine or Stalk of the Grape Hop, with Charcoal and Loss deducted.

Per centage of ash, 5·1.

Silica (or pure sand)	5·66
Chloride of sodium (common salt)	9·98
Soda	2·32
Potash	12·97
Lime	17·39
Magnesia	12·61
Sulphuric acid	3·14
Phosphoric acid	8·14
Phosphate of iron	2·06
Phosphate of alumina	1·55
Carbonic acid	24.18
Manganese	a trace.

Composition and per centage of the Ashes separated from the Carbonic Acid.

Real Quantity per Cent. of Mineral Ingredients in the Hop, Leaves of the Hop, and Bine, dried at the temperature of boiling water, found by deducting Carbonic Acid, Water and Loss.

	Hop.	Leaves.	Bine.
Per cent. .	15·3	19·7	3.9

Composition in one hundred parts of the Inorganic Matter.

	Hops.	Leaves.	Bine.
Silica	25.83	25.87	7.46
Chloride of sodium.	3.29	5.82	13.16
Chloride of potassium	2.28	..	..
Soda	..	2.93	3.06
Potash	19.25	6.52	17.11
Lime	24.58	40.99	22.81
Magnesia	6.34	7.92	16.64
Sulphuric acid	4.31	4.60	4.15
Phosphoric acid	5.44	4.67	10.74
Phosphate of iron	7.03	0.68	2.72
Phosphate of alumina	..	..	2.15
Manganese	1.65	..	a trace.

Quantity of Inorganic Matter taken from the Land by Three Hills of Grape Hops.

The following table gives us the actual weight in *grains Troy* of the various ingredients removed from the soil by three hills of grape hops :—

Actual Weight of Mineral Ingredients removed from the Soil by Three Hills of Grape Hops.

	Hops.	Leaves.	Bine.
Silica	947.96	281.21	50.43
Chloride of sodium.	117.45	63.26	88.97
Chloride of potassium	82.39	..	..
Soda	..	31.85	20.68
Potash	706.47	70.87	115.67
Lime	902.08	445.56	154.19
Magnesia	232.67	86.09	112.48
Sulphuric acid	158.17	50.01	28.06
Phosphoric acid	199.64	50.76	72.61
Phosphate of iron.	258.01	7.39	18.38
Phosphate of alumina	..	..	14.53
Manganese	60.56	..	a trace.
Total	3665.40	1087.00	676.00

Amount of Mineral Ingredients removed from the Soil by an Acre of Grape Hops.

In the present instance I believe about 1260 to be the number of hills contained in an acre.

Therefore, by multiplying the numbers in the preceding table by 420, we shall have the actual weights of the various inorganic ingredients of the soil removed from an acre of land by the hop.

For the convenience of agriculturists, I give, in the following table, these weights in pounds and ounces avoirdupois :—

Amount of various Mineral Ingredients removed from an Acre of Land by the Grape Hop.

	1732 lbs. of hops.		380 lbs. of leaves.		1155 lbs. 12 oz. of bine.		Total in hops, leaves and bine.	
	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.
Silica	56	14¾	16	14	3	0	76	12¾
Chloride of sodium	7	0	3	14	5	5	16	3
Chloride of potassium	4	15	..		..		4	15
Soda	..		1	14	1	4	3	2
Potash	42	6¼	4	4	6	15	53	9¼
Lime	54	1½	26	11	9	4	90	0½
Magnesia	13	15	5	2	6	12	25	13
Sulphuric acid	9	7½	3	0	1	11	14	2½
Phosphoric acid	11	15½	3	0	4	5½	19	5
Phosphate of iron	15	7½	0	7	1	1½	17	0
Phosphate of alumina	..		..		0	14	0	14
Manganese	3	10	..		..		3	10
Total	219	13	65	2	40	8	325	7

It will be seen from the preceding tables that a large amount of inorganic or mineral matter is removed annually from the soil by the hop. As the produce is almost wholly exported from the farm, it must be evident that unless the mineral matter is replaced, the richest soil would eventually be impoverished by the growth of this plant. This undoubtedly is one of the chief causes of the necessity of manuring this plant so highly.

The amount of mineral matter taken by the two species of hop varies considerably; but we must consider the Farnham hop to have taken from the land rather under the mark than over. According to the nature of the soil will be the necessity of applying one or all of the mineral ingredients enumerated; but potash, which in both seems to be taken out in nearly the same quantity for the same amount of crop per acre, is one of the most important ingredients, because the most scarce. Lime ought to be of service to the hops, as it is not only itself a necessary ingredient, but will likewise assist in the liberation of potash and silica from the insoluble silicates of the soil.

From the examination of various samples of hops, I am led to believe that the finer samples of hops require more potash than the coarser, and that the potash is replaced in the coarser hops by lime. Wood-ashes should certainly be of benefit to hops, as may be perceived at once from the following analysis of the common wood-ashes of the district of Farnham, for which (together with the following) I am indebted to my pupil Mr. James Allen:—

Analysis of Wood Ashes from Farnham.

Silica	4·25
Sand	10·00
Charcoal	0·35
Lime	29·05
Magnesia	6·65
Potash	7·55
Soda	4·89
Chloride of sodium	0·80
Sulphuric acid	3·25
Phosphoric acid	4·70
Carbonic acid	25·00
Phosphate of iron	2·50
Phosphate of alumina	0·50
Manganese	a trace
ALLEN	99·40

Peat-ashes might, with the addition of some salt of potash, also be used with advantage.

Analysis of Peat Ashes from Farnham.

Silica	5·50
Sand	46·10
Charcoal	16·85
Lime	5·35
Magnesia	0·10
Chloride of sodium	0·40
Chloride of potassium	0·60
Sulphuric acid	3·25
Phosphoric acid	0·60
Carbonic acid	2·50
Oxide of iron	13·50
Alumina	4·40
ALLEN	99·15

The spent hops of the brewer have been proposed as a useful manure for hops. Irrespective of their organic matter, they will also do good from their mineral ingredients. I subjoin an analysis of spent hops, from the brewery of Mr. Godden, of Maidstone, Kent. As might have been expected, the chief of the potash and other soluble ingredients have been washed away.

Analysis of the Mineral Ingredients of Spent Hops.
The Spent Hops gave 10·4 per cent. of Ashes.

Sand and charcoal	21·80
Silica (soluble sand)	27·10
Chloride of sodium (common salt)	2·95
Chloride of potassium	0·70
Potash	1·45
Lime	23·70
Magnesia	2·75
Sulphuric acid	3·05
Phosphoric acid	4·10
Phosphate of iron	2·50
Carbonic acid	9·00
Manganese	a trace.
	99·10

The following observations will show the large amount of common manures necessary to supply the potash to an acre of hops :—

The average quantity of potash contained in guano is 3 lb. per cwt.

The straw of wheat contains on an average 5 per cent. of ashes, and every 100 lbs. of the ashes contain about 13 lbs. of potash.

Farm-yard dung contains on an average 7 per cent. of mineral ingredients. These contain about 3½ per cent. of potash.

The following table, which gives us the weights of different manures necessary to furnish 17 lbs. of potash to an acre of land, will make it probable that the large quantity of potash taken out of the land by the hop, is the main reason for the necessity of manuring this plant so highly.

7.—Quantity of Guano, Farm-Yard Dung, or Wheat Straw, necessary to furnish the 17 lbs. of

Potash taken from the Soil by the Acre of Farnham Hops.

Hops, leaves, and bine of one acre of hops, containing 500 lbs. hops, 146½ lbs. leaves, 289 lbs. bine.	Guano.	Wheat straw.	Farm-yard dung.
935½ lbs.	7 cwt.	23 cwt.	61 cwt.

It is evident, from the foregoing table, that though 2 cwt. of guano are amply sufficient to supply the acre of hops with its phosphates, yet that it requires 7 cwt. to supply the potash. Consequently the 5 cwt. of guano might have been replaced by a cheaper manure destitute of phosphates, but containing 12½ lbs. of potash.

Hitherto I have spoken as if the hops, leaves, and bine of the acre of Farnhams were of the usual or average weight. But this was not the case. Owing to the unkindly weather, the yield was very deficient. It is no uncommon thing in some districts to grow a ton of hops an acre. We will suppose a farmer to grow a ton of hops per acre, and that the mineral ingredients of the hop are in the same proportion as in those which were analyzed.

We will suppose that the bine and leaves were double in quantity, but containing the same per cent. of inorganic matter as the others. This would give us 64 lbs. removed per acre by the Golding hop, while the Grape hop would remove about 75 lbs. per ton, though perhaps 64 lbs. might be taken as the average.

The following table will then show us the weight of guano, wheat straw, or farm-yard dung, per acre, necessary to be put on the land, to replace the potash withdrawn by the hops, bine, and leaves :—

8.—Quantity of Guano, Wheat-straw, or Farm-Yard Dung, annually necessary to replace the 64 lbs. of Potash taken from an acre of land by a ton of Hops, with Bine and Leaves corresponding.

Hops, leaves, and bine of an acre of hops, containing 2240 lbs. of hops, 293 lbs. of leaves, 578 lbs. of bine.	Guano.	Wheat straw.	Farm-yard dung.
	ton. cwt.	tons. cwt.	tons. cwt.
3111 lbs.	1 5	4 7	11 13

Now, as the whole of the above methods of furnishing the necessary amount of potash are enormously expensive, we are necessitated to look to other and cheaper sources for this valuable substance.

Several salts of potash are well known in commerce, and likewise to the agriculturist. Nitrate of potash or saltpetre is one, and common pearlash is another.

Saltpetre contains about 47 per cent. of potash, and pearlash about 68 per cent. By calculation, therefore, we find that 64 lbs. of potash taken from the land by a crop of hops would be replaced by 136 lbs. of saltpetre, at a cost of about 32s., or by 94 lbs. of pearlash, at a cost of about 33s.

The weights of saltpetre or pearlash given above would supply the deficiency of potash, supposing the whole crop, including bine, leaves, and hops, were removed from the land. But if the bine and leaves be allowed to rot on the ground, about *one-sixth* less than the preceding amounts would be sufficient. The impropriety, therefore, of removing the bine, &c., from the land, as is too often the case, is very apparent.

One of the most important points to be deduced from these analyses is the preparation, at a reasonable expense, of a manure which shall contain all the necessary mineral ingredients for the growth of the hop. Being engaged in the analyses of various other samples of the hop, I am now unwilling to offer as perfect any manure for the hop until the comparison of different varieties shall have shown that the hops in divers localities agree in the per centage of their various constituents.

It will be seen by reference to the analyses, that besides potash, the hops contain phosphoric acid, lime, magnesia, common salt, and silica. About 3 cwt. of guano would supply the necessary amount of phosphates. The chloride of sodium would be amply supplied by 1 cwt. of common salt. Lime and magnesia are doubtless found in sufficient quantities in the land; or if not, they can easily be supplied. The silica, perhaps, may be found in sufficient quantities in the land, though it might be better to supply both silica and potash together, in the shape of silicate of potash. This compound, however, is not at present an article of commerce, but there is a probability that it will soon be manufactured on a large scale. The sulphuric acid can be supplied by gypsum.

Either of the following mixtures might be worth trial for promoting the growth of the hop :—

No. 1.—Manure for an Acre of Hops.

	s.	d.		£	s.	d.
3 cwt. guano, at	8	0	per cwt	1	4	0
1 cwt. common salt, at	1	0	,,	0	1	0
1½ cwt saltpetre, or 1½ cwt. silicate of potash, at	26	6	,,	1	19	9
¼ cwt. gypsum	1	6	,,	0	0	9
Cost per acre				3	5	6

No. 2.—Manure for an Acre of Hops.

	s.	d.		£	s.	d.
1 cwt. guano, at	8	0	per cwt	0	8	0
1½ cwt. superphosphate of lime, at	8	6	,,	0	12	9
1 cwt. common salt	1	0	,,	0	1	0
1 cwt. pearlash, or equal value of silicate of potash	38	0	,,	1	18	0
½ cwt. gypsum	1	6	,,	0	0	9
Cost per acre				3	0	6

Experience, however, alone can prove whether the above manures are adapted for the end proposed, and they are proposed therefore as subjects of experiment merely.

Some other interesting points respecting the organic portions of the hop, the use of organic matters, as shoddy, rags, &c., and the analyses and relative values of the various manures which are considered beneficial to its growth, will be made public as soon as the necessary analyses are completed.

HALESWORTH FARMERS' CLUB.

REPORT.

The Committee of the Halesworth Farmers' Club, in submitting to the members a brief record of the proceedings of the institution for the past year, are aware that any lengthened observations with regard to its particular merits would be both presumptuous and unreasonable, especially participating as they do in the feeling so extensively entertained with regard to the usefulness and value of such societies.

Your committee would, however, request permission to observe, that when they reflect upon the singular character of the times, and the unsettled state of society arising from various conflicting opinions which now exist, upon subjects materially affecting the best interests of all those connected with agriculture, they would be wanting in that proper sense of candour and respect due to their fellow-members, did they not express their conviction, that never, since the formation of such institutions, has the zealous co-operation of those who compose them been more imperatively demanded than at the present period.

Adverting to the various topics selected for discussion, whilst your committee are bound in fairness to declare the paramount importance which they have attached to those immediately affecting the interest of the farmer, they have not been unmindful of such as concern the welfare of the landowner, or the condition of the labourer; certain as they are, that not only is it an incumbent duty that the respective claims of each should be regarded with due consideration, but that such is the only line of conduct calculated to insure the happiness of all classes so mutually dependant.

The first business which occupied the attention of the club consisted in re-appointing a committee, revising the rules, and arranging subjects for discussion for the ensuing year.

The secretary was also requested to acknowledge the receipt of a valuable present to the society, from William Shaw, Esq., London, comprising Von Thaer's Principles of Agriculture, in two vols.

At the first monthly meeting, held Dec. 20th, the chairman, in a neat and appropriate address, expressed his grateful sense of the honour conferred upon him by the members of the club, in placing him in the position of president to the society.

The subject for discussion was the "Malt Tax." The introducer having alluded to the magnitude of the question, and the great difficulty of elucidating its various details, entered into a statement (derived from practical information) of the malt and beer duties, at various periods, commencing in 1720, until a repeal of the latter in 1830, and the present rate of duty payable upon the former, viz.—21*s.* 9*d.* per quarter. Reference was then made to the amount of revenue (viz. four millions net) produced from the malt tax—a part of the subject which he considered of great moment, insomuch that it was highly essential that the necessity for its removal should be first clearly ascertained; and if such a result should be arrived at upon settled principles, it was not less imperative that the substitution of some other tax should be suggested; and the continuance of a moderate tax on property (that is, rental and proceeds of funds) was mentioned as an alternative deserving consideration. The opinions of various eminent political economists, touching the injury, or otherwise, sustained by the malt tax, and the probable effects incident to its repeal, were then cited and commented upon; and the leading objections taken by a portion of the metropolitan press against the repeal movement, and the views entertained by its supporters, were also noticed with considerable ability and effect. It was a question of doubt in the mind of this gentleman, whether the repeal of the malt tax would be fraught with those advantages which many represented; and arguments were adduced to show that an increased quantity of land would probably be brought into cultivation, and that a foreign competition, detrimental to the interest of the farmer, might ensue; whilst the small duty payable on beer, viz. two-pence per gallon (presuming one quarter of malt to produce 144 gallons), would not materially affect the comfort of the labourer. The comparative advantage of public over private brewers was next adverted to, and the difference in favour of the former, owing to their more scientific process, was estimated at twenty-five per cent. The restrictions as to public brewers, under two acts of parliament, were also noticed and explained. Allusion was then made to the usefulness of malt for the purpose of fattening cattle, five quarters being represented as equal in value to a ton of oil-cake. The question of the excise laws, as affecting the interest of maltsters, was next entered upon, and the equity of their present construction, as compared with their stringent nature fifteen years ago, was ably and clearly demonstrated. With regard to the moral point of the question, it was advanced, that if the duty on malt were repealed, inducements to intemperance might probably increase; and looking at the immense revenue deriveable from tea, coffee, molasses, and other necessaries of equal importance, the introducer concluded a highly interesting address by recommending the propriety of a modification of such duties, in preference to the abolition of the malt tax.

In reply to the arguments of the preceding speaker, it was observed by the following member that he differed widely in opinion with those theorists who imagine that injury would accrue to the farmer from changes of cropping, or the bringing additional land into cultivation; he being of opinion that a repeal of the malt tax would produce a decidedly contrary effect. Although less security against the use of pernicious agents in brewing would be afforded, yet it was contended that great benefit must necessarily accrue to the labouring classes, by placing within their reach the means of procuring genuine home-brewed beer, which would tend materially to improve their moral as well as physical condition.

Another member considered the malt tax equally baneful in its operation as regards landlord, tenant, and labourer, and asserted, that as the law at present exists, the produce of every occupation in his immediate neighbourhood was liable to a greater amount of malt-tax than tithe. For a period of twenty years, this gentleman has procured only one coomb of malt for a quarter of barley; and connecting this circumstance with the important fact of the use of malt as a substitute for oil-cake, and the extravagant price at which beer is furnished to consumers, he concluded by recommending a repeal of the malt-tax as a great boon to the community at large.

After a protracted debate, the following resolution was adopted :—

Resolution.—"The subject of the malt tax having fully occupied the attention of this meeting, it is the opinion of those present that its repeal would be highly desirable; and it is respectfully requested that the committee, as now constituted, communicate further on the subject with the neighbouring farmers' clubs."

At the second monthly meeting, held January 24th, which was numerously attended, communications from the Wrentham and Yoxford Farmers' Clubs were read, expressing their desire to unite with the Halesworth Farmers' Club, in preparing a requisition to the magistrates to convene a Hundred meeting, for the purpose of considering the propriety of petitioning the legislature for a total repeal of the malt-tax; the result of which was a cheerful compliance on the part of those gentlemen, and the eventual attainment of two petitions, each bearing 2178 signatures, which were subsequently submitted, through the respective representatives of the county, to either house of parliament. The subject which formed the basis of the evening's discussion was "The proposed alterations in the existing law of settlement." The great evils arising from the imperfect and unsatisfactory state of the present law, as regards passing paupers to their respective parishes, having been first noticed, it was affirmed, that under the proposed alterations increased inducements would exist, in certain localities, for landlords to disburthen themselves of an equitable proportion of the poor rates, by reducing the number of cottages upon their estates, to the disadvantage of the more populous villages and thickly inhabited towns.

A statistical account of the increase or decrease of population, and the number of poor relieved within a given period, in eight parishes of the Blything Union, was adduced, to show the unjust pressure of the changes contemplated by the government: namely, of effecting a settlement either by birth or a five-years' residence. The resolution of Mr. Dover, passed at a meeting of the magistracy of Norfolk, and the remarks of Mr. Wright upon the subject in question, were then quoted from the "Norwich Mercury" of the 11th of January, to which the speaker gave his unqualified assent.

Poor laws, it was remarked with great emphasis, are the main stay of the property of this country; and the interests between the owner of property and the poor man being reciprocal, every description of property is entitled to bear an equitable proportion of poor rates; and to this end, the formation of district unions, with a view to extend such system to counties, and ultimately to make the poor a national charge, was strongly enforced.

The following series of resolutions were then submitted in consecutive order; and although various objections were taken by different members, they received the sanction of a large majority of those present:—

First, "That it is the opinion of the members present, that a settlement by either birth or residence, as contemplated by the proposed bill, cannot be considered a fair and just principle, on account of the great hardship which would certainly be inflicted upon all large towns and villages where great facilities exist for building cottages for the residence of the poor; and if such a system be adopted, the towns and villages will be very much injured, in consequence of giving residence to such larger population than at present legally belong to them; while other parishes, being *cleared* of cottages, will be benefited in an equal ratio: it being a well authenticated fact that many parishes do not contain a sufficient number of cottages to give residence to the labourers absolutely required for the proper cultivation of the land."

Second, "And are also further of opinion, that parochial settlements, by whatever means acquired, are bad in principal; and not only tend to oppress the labouring classes unjustly, but act very injuriously on their morals by narrowing the sphere of their exertions. The labouring man, having nothing but his labour to depend upon for the support of himself and family, ought, in consequence, to be allowed full liberty to sell the same for the most money he can obtain, and at the best market; but this right cannot be obtained under the present system, he being confined within the narrow boundary of the parish to which he belongs, which tends very much to place the inefficient labourer and man of bad character on an equal footing with the skilful workman and man of good character."

Third, "In order to obviate the difficulties before alluded to, the members present do most strongly urge the necessity of the immediate formation of whole unions for the purpose of district settlement and management of the poor, and that all property in each district or union be rated agreeably to the provisions of the Parochial Assessment Act, for the purpose of raising a common fund for the general management of the poor, and that the landlords (in lieu of the tenants) should be assessed for every cottage, tenement, or occupation, under the annual rateable value of *ten* pounds."

Fourth, "The above plan will give the honest labourer full liberty to carry his labour to the best market, and thus enable him to reap the benefit of his skill and good character, and will tend materially to raise the moral standard of this class in the scale of society; as, at present, skill and good character are not so much considered as the parish to which he belongs, which has a very considerable tendency to depress his energies, and, in a great measure, place the inefficient labourer and bad character on an equal footing with himself."

Fifth, "If the principle of district settlement and management of the poor be recognized and adopted, it might be then further extended to a county, and, as soon as shall be deemed compatible to the legislature, the same should be merged into a general national charge throughout England and Wales."

Sixth, "That the members present are most decidedly of opinion that, until some plan of this kind be adopted, no alteration in the laws of parochial settlement will be effectual as a remedy for the evils attendant on the present system; and although they recommend that unions or districts be formed for the purpose of general settlement and management of the poor, they only adopt it as a matter of expediency under existing circumstances, being firmly impressed with the correctness of the principle, that the same should be made a national measure, in order that every description of property in the kingdom may be called upon to contribute its fair, full, and equitable quota for the support and management of the poor."

At the monthly meeting held February 21st, the subject of "The partial substitution of manual for animal labour" was entertained by the members. The experience of the gentleman who introduced this question led him to the conclusion, that by a prudent application of manual labour the number of horses usually employed upon 160 acres of arable land (accounting four acres of summerland to a horse) might be reduced one-tenth—a result much to be desired; as, taking into account the cost price of the animal, the expense of keep, risk, and deterioration in value, a saving of at least £20 per annum would be effected. To accomplish so desirable an object, the removing spear-grass by forking and picking lands after harvest, intended in the ensuing year for roots, and also barley and bean stubbles, were operations strongly advised; and the continual employment of boys and girls, as tending to encourage habits of industry, to the suppression of vice and crime, was warmly advocated.

The system of threshing barley, and sometimes wheat, by flail instead of machines was also recommended; the advantages incident to a regular supply of straw, chaff, and colder, being deemed equivalent to the pecuniary saving attached to the use of such implements, independently of which a greater constancy of work is, in occasional instances, insured to the labourer. It was the opinion of one member that the autumn was the most trying and severe season for horses, and in order to diminish their labour (particularly in unfavourable weather), the carrying off roots, and barrowing manure or mould for beans, had each been practised and attended with satisfactory results.

After many valuable ramarks, the following resolution was submitted, which met with unanimous approval:—

Resolution.—"That this meeting considers the partial substitution of manual for animal labour to be capable of beneficial extension (especially upon occupations varying from 160 acres and upwards), in promoting an improved cultivation by forking, picking, and collecting spear-grass and noxious weeds from bean, barley, and wheat stubbles (particular attention being paid to such of the latter as are intended for roots); by which means the ordinary labour of horses would be considerably reduced, and their number proportionably diminished. The conveying turnips from heavy lands by manual labour, barrowing manure for beans, claying, and the like operations, have also, in uncongenial seasons, been performed with success, and are confidently recommended to more general adoption."

At the next monthly meeting, which was attended by about forty members, the subject of "The various manures and their application" was discussed.

The gentleman who introduced this important question arranged the subject under three heads, viz., organic manures, or such as are of animal and vegetable origin; inorganic, as the earths, &c.; and saline, or artificial manures. After explaining with great clearness the nature and properties of each, their adaptation to particular crops, and the fittest time for applying them, the speaker proceeded to mention the superiority of *farm-yard manure* above all others as the staple commodity upon which the British farmer must mainly depend; because, first, the elements of such manure, when decomposed, become the natural food of plants; second, the variety of these elements makes it serviceable to all kinds of vegetables; third, that when seasons are not favourable to the full development of the powers of farm-yard manure, yet it is neither lost nor proves injurious, as is frequently the case with saline or artificial manures; fourth, that common practical experience enables a farmer to use it safely and advantageously, which cannot be said of some of the earths and artificial manures, which in many cases are positively injurious; and, lastly, that it is the most economical of all others, requiring little more than labour for its due preparation.

The observations of the speaker, which evinced great intelligence, were listened to with more than ordinary attention, and gave rise to an animated and interesting discussion. At a subsequent meeting the following resolution, embodying the views of the members of the club upon the question, was unanimously agreed to, viz.—

Resolution.—"The subject of the nature and properties of the different manures, &c., having received the fullest consideration of the members present, they are unanimously of opinion that amongst all the various manures none can be so safely depended upon as well-prepared farm-yard manure, both as regards certainty in respect to the produce, on an average of crops, and on the score of economy as regards expense. That this opinion, which has been held by the best practical agriculturists in all ages, is fully borne out in this district by the individual experience of the members present. That the true interest of the British farmer is to husband his home resources; and to that end his best attention should be devoted to the due preparation of farm-yard manures, so as to produce the best quality and the greatest quantity. That, although the members are fully sensible of the great value of many artificial manures, yet they consider such ought not to be depended upon as principals, but only to be used as auxiliaries whenever a deficiency of farm-yard manure exists, or local circumstances point out the propriety of their employment."

"The comparative position of farmers under corn rents and fixed money payments" formed the subject for inquiry at the meeting held on the 11th of April.

The member who introduced this question, after some preliminary remarks, expressed his deliberate conviction, that the most equitable plan of letting land is that suggested by Mr. Layton Cook, namely, according to fluctuations in the value of produce, substituting a variable scale for a fixed rental; thus reducing the speculation to which, in all cases, the farmer is exposed from seasons, &c., and decreasing his liability for rent as his means of paying become diminished. In calculating the value of a farm, it is the duty of the tenant, having formed an opinion of its productive power, first to ascertain the amount of tithes or rent-charge, rates, taxes, labour, interest of capital, and other incidental expenses, and afterwards estimate the rent or share of produce to be awarded to the proprietor; in contradistinction to the plan too frequently adopted, namely, that of making rent the *primary* consideration. Under a system of corn-rents, it was affirmed, the price of produce equally affects the proprietor and occupier; whilst under the liability of fixed payments not only is the tenant's capital held in great insecurity, but, in the event of any fiscal alteration, his independence is compromised by obliging him to solicit for an abatement or submit to the possibility of entire ruin. In confirmation of the opinions entertained in favour of corn-rents copious extracts from the evidence of the Scotch farmers before the Committee of the House of Commons were cited, and considerable weight was attached to their authority on the subject. With regard to the most equitable principle of *commuting* fixed payments into corn-rents, it was agreed that, in all cases, an equal quantity of wheat and barley should be added together; the only disparity of opinion which prevailed was as to the propriety of adopting a maximum and minimum, which, upon a show of hands, was decided in favour of such a system.

The subjoined table, showing the practical bearing of fairly-constructed corn-rents upon three distinct classes of farms of 100 acres, presuming one-fifth of each to be in pasture, and the residue farmed according to the four-course system of husbandry, was then submitted to the inspection and approval of the members present.

A TABLE SHEWING THE RELATIVE PROPORTIONS OF PRODUCE OR MONEY PAYMENT DUE TO LANDLORDS FOR RENT, UPON ONE HUNDRED ACRES OF LAND, UNDER FLUCTUATING PRICES.

Average price per Quarter of		Ordinary Farm 45 qrs. 4 bus. of Wheat and Barley.			Average Farm 59 qrs. of Wheat and Barley.			First-rate Farm 72 qrs. 6 bus. of Wheat and Barley.			Average Rent of Farms per Acre.					
Wheat.	Barley.	In = parts.			In = parts.			In = parts.			Ordinary.		Average.		First-rate.	
s.	s.	£	s.	d.	£	s.	d.	£	s.	d.	s.	d.	s.	d.	s.	d.
32	18	56	17	6	73	15	0	90	18	9	11	6	14	9	18	0
40	24	72	16	0	94	8	0	116	8	0	14	6	19	0	23	3
48	28	86	9	0	112	2	0	138	4	6	17	3	22	6	27	6
56	32	100	2	0	130	0	0	160	1	0	20	0	26	0	32	0
64	36	113	15	0	147	10	0	181	17	6	22	9	29	6	35	3
72	40	127	8	0	165	4	0	203	14	0	26	6	33	0	40	9
80	46	143	6	6	185	17	0	229	3	3	28	9	37	0	45	9

According to the above scale,

The ordinary farm, with wheat and other produce, at the prices at which the Tithe Commutation Act was based, would be........................20s. per acre, or £100
The average ditto....................26 „ 130
The first-rate ditto ....32 „ 160
} Subject to tithe rent-charge and other outgoings, except landlord's taxes, insurance, and repairs.

After a long and animated discussion, the following were the terms of the resolution agreed to :—

Resolution.—" That it is the unanimous opinion of this meeting that a more general adoption of corn-rents (in connection with permanent and modified leases) would place the tenant farmers of this district in a comparatively better position, than when under the liability of fixed money payments."

At the meeting held May 23rd, the sweepstakes for roots were commenced with great spirit; after which, the subject of "The propriety of effecting a general equalization in the Prices of Farm Labour with the current Prices of Agricultural Produce," was introduced.

Owing to the many contingent circumstances connected with the article of *taken work*, it was considered that no uniform system of payment could be adopted; but the application of such a principle to day labour, although accompanied by some disadvantages, was, nevertheless, warmly advocated.

The production of many interesting calculations (varying only in detail) with regard to a fair remuneration for agricultural labour, emanated from this question; amongst which the annexed table, assumed upon the principle of an average family to consist of five persons, and their consumption to be 2½ stone of flour weekly, was laid before the members :—

Price of Flour per stone.		Wages per day.		Amount per week.		Cost of Flour per week.		Surplus after purchasing Flour.	
s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
1	8	1	4	8	0	4	2	3	10
1	10	1	5	8	6	4	7	3	11
2	0	1	6	9	0	5	0	4	0
2	2	1	7	9	6	5	5	4	1
2	4	1	8	10	0	5	10	4	2
2	6	1	9	10	6	6	3	4	3
2	8	1	10	11	0	6	8	4	4
2	10	1	11	11	6	7	1	4	5
3	0	2	0	12	0	7	6	4	6

A great difference of opinion prevailed, as to the best method of fixing a *standard* by which to regulate the price of day wages; some members contending for the adoption of *flour*, as less fluctuating in value; whilst the majority preferred taking *wheat*, the average price of which should be ascertained from the Corn Inspectors' returns of the different market towns in the vicinity. The following resolution embraces the views entertained by the meeting:—

Resolution.—"That the members of this club, having taken into consideration the propriety of effecting a general equalization of the prices of farm labour with the current prices of agricultural produce, are of opinion that, owing to the variety of soils in this neighbourhood, their previous cultivation, the difference in the time at which many farming operations are performed, and other collateral causes, *no* uniform price at which to *put out work* to agricultural labourers can with propriety be advised; although they (the members) are bound to record their unqualified approval of such a system, as best calculated to promote the interests of both the employer and employed. But when necessary to have farm labour performed by the *day*, it is deemed highly desirable to establish one uniform system of payment, according to the prices of agricultural produce—such payment to vary at the rate of twopence per day for every fluctuation of one shilling per bushel in the value of wheat."

At the monthly meeting held June 20th, "The Nature and Advantages of the Allotment System," occupied the attention of the club. The gentleman who kindly consented to introduce this question prefaced his remarks by alluding to the operation of the Labourers' Friend Society, and mentioned, as an instance of the good resulting from its labours, that upwards of 100,000 allotments of land had been made to agricultural and other labourers in different parts of the country. In order to prevent unnecessary loss of time, it was deemed highly essential that allotments (which should be exclusively cultivated by spade) should be situated as near to the labourers' houses as possible. With regard to the size of allotments, a quarter of an acre was considered most ample, although, in some cases, and under peculiar circumstances, more had been found beneficial; and the rent should not exceed the average amount per acre given for land in the locality. The letting free of tithes and parochial charges was in all cases recommended. With a view to prevent misunderstanding, printed rules should be drawn up, and in no instance should the land be under-let. After alluding to the evil effects of the sub-letting system in Ireland, the speaker, in a very feeling and forcible manner, pointed out the advantages of the allotment system, as calculated not only to ameliorate the physical and moral condition of the poor man, but also, by the augmented production of the soil, the diminution of poor-rates, and the limit put to the increase of population arising from the more provident habits of the poorer classes, to benefit to a great extent the community at large; and, by way of illustration, extracts from Marshall's Travels in Denmark were quoted, to show that, in particular districts in that country (as also in several parishes in Wiltshire and Kent) the introduction of the allotment system had been attended by the happiest results.

After several concurrent observations from various members, the following resolution was agreed to:—

Resolution. — "That it is the unanimous opinion of this meeting that it is highly desirable, with a view to improve the physical and moral condition of the poor, that the system of cottage allotments should be introduced into every parish, regard being had to the locality as to distance from the labourer. That the quantity of each allotment should not be more than a quarter of an acre, and that the rent, including all outgoings, should not exceed per acre what the tenant farmers are paying in their respective parishes."

"The expediency of effecting insurances of neat stock, &c.," was submitted for discussion at the monthly meeting held on the 18th of July. After alluding to the nature and advantages of insurance institutions generally, and their almost universally acknowledged importance, the introducer expressed his regret that, owing to the limited amount of information he was able to procure with regard to *cattle insurance societies*, his knowledge of their general benefits was very circumscribed and imperfect. In the absence, however, of other authentic information, he (the speaker) begged permission to refer to the prospectus of the Farmers' and Graziers' Mutual Cattle Insurance Association, which, with the conditions and system of business pursued by that institution, were submitted to the meeting, and gave rise to many interesting remarks; all present approving the 30s. rate of premium, but deprecating the 50s. or epidemic clause—the latter being happily considered as not applicable to this locality.

In order to form a tolerably correct notion of the practical utility of effecting cattle insurances in this neighbourhood, a paper was introduced, accurately detailing the several instances of mortality amongst animals, which had occurred upon twenty-six occupations, extending to 3,420 acres, during four years' experience of one of the members of the club, and which would show a balance in favour of the insurers amounting to £3 14s. 7d. After some desultory remarks, the following resolution was adopted:—

Resolution.—"The expediency of effecting insurances of neat stock, &c., having engaged the attention of the members present, in connexion with the rates and conditions of the Farmers' and Graziers' Mutual Cattle Insurance Institution, it is resolved that, although the members are unable to arrive at any satisfactory conclusion, owing to their limited experience with regard to the various details connected with the department of insurance in question, nevertheless sufficient evidence has been adduced to lead them to the unanimous approval of such a system, so far as regards the 30s. rate of premium; and they further concur in recommending the entire subject to individual consideration."

Owing to the lateness of the harvest, the meeting of the 19th of September was but thinly attended, and the question proposed for discussion—viz., "The nature and properties of different kinds of food used for rearing and fattening animals"—was consequently postponed until the 17th of October.

In order to explain this interesting subject, it was arranged under three different heads: viz., first, organic chemistry; second, the elements of respiration; and third, the production of fat and muscle. In carrying out the details connected with this question, the views of the celebrated Liebig were quoted, he being recognised as the first living authority in these particular departments of science. By the aid of organic chemistry, it was remarked, we are enabled to discover the proximate and ultimate composition of all the animal tissues, the purity of the air we breathe, the water we drink, and the food we take for our support. For the maintenance of life, certain conditional circumstances are necessary; the first of which is the assimilation of appropriate matters constituting nourishment; the second, a continual absorption of air from the atmosphere, for the generation of heat, &c.; and upon the mutual action of these, the one on the other, depend all vital phenomena.

Having enumerated the various undecomposed bodies found in the blood, the following table from Liebig, showing the principles met with in food, and their uses, was presented to the members.

Nitrogenized Foods, or Elements of Nutrition.	Non-nitrogenized Foods, or Elements of Respiration.	
Vegetable fibrine	Fat	Starch
„ albumen	Gum	Sugar
„ casein	Wine	Beer
Animal blood	Spirits	
„ flesh	Vegetable jelly	

A chain of interesting chemical facts were then adduced in support of this part of the subject. One of the effects of respiration, the speaker observed, is, that during the passage of the blood through the lungs, oxygen is absorbed from the atmosphere, and carbonic acid gas is given out in exchange. Oxygen is conveyed by the blood to all parts of the body, and becomes converted into carbonic acid and water; and since whenever carbon is converted into carbonic acid by union with oxygen, or hydrogen and oxygen unite to form water, heat is evolved, it is evident that "*animal heat*" is maintained by the mutual action of the elements of the food and the oxygen of the air upon each other. As air is expanded by heat and contracted by cold, it is obvious that equal volumes of hot and cold air must contain unequal weights of oxygen: therefore a larger proportion of food is required when animals are exposed to cold situations, than when under the influence of well-sheltered localities. To elucidate this part of the subject, the following trite yet perfect comparison was instituted; viz., that the body of the animal is the furnace, the food is the fuel, the excrements are the ashes, and the gases expired from the mouth are of the same composition as those which fly up the chimney of the furnace. With reference to the third branch of the subject, or the production of fat and muscle, it was asserted to be an object of great importance, that the various breeds of animals and their conformations should be well understood, in order that their future management may be conducted with profit or success. The aptitude of animals to fatten depends in a great measure upon the size of their lungs and livers, hence their arrangement has been placed by Dr. Playfair in the following order: the pig first, the sheep second, the ox third, and the horse last. On this point, however, it was observed, that an expanded chest does not always co-exist with large lungs; and the new Leicester sheep, as possessing a wider chest when compared with the Southdown, was quoted in illustration.

Having remarked that in all well-directed attempts to rear as well as fatten animals, a correct judgment of the properties of the food given for either purpose was absolutely necessary, the speaker observed, that in conducting comparative experiments, an exact knowledge of the temperature of the places in which the animals are located is not less important than the relative properties and quantities of food which are consumed.

To promote the growth of young stock, by administering such descriptions of food as are best calculated to produce the largest quantity of muscle at the least expense, should be an object of solicitude to the farmer; and, to this end, substances yielding albumen or fibrine are highly essential—instead of the practice sometimes adopted of feeding in too large quantities, with linseed cake and other ingredients, which possess excellent fattening properties, but are not suited to the development of flesh and bone.

Great importance was attached by the speaker to the form, as well as to the regularity, necessary to be observed in administering food to animals; and the invariable system pursued by some farmers in steaming and boiling food, was condemned as being erroneous; as, by too great a reduction, the process of mastication, which causes a proper secretion of saliva and supply of oxygen to the food, is to a certain extent destroyed.

The following calculation, showing the respective quantities of the fleshing and fattening properties contained in an acre of the different crops commonly used in rearing and feeding stock, was then obligingly submitted :—

One Acre of	Produce per acre.	Weight of Grain per bushel.	Weight of Gluten, Albumen, and Casein.	Weight of Starch, Gum, Sugar, and Fat.	Weight of Water per acre.
		lb.	lbs.	lbs.	lbs.
Beans	25 bush.	64	450	672	256
Peas............	25 ,,	66	380	845	208
Oats............	50 ,,	42	290	1168	336
Hay............	3 tons	..	480	2790	752
Potatoes	6 ,,	..	300	1665	10175
Carrots	12½ ,,	..	560	2900	23800
Turnips	15 ,,	..	400	3350	28475
Wheat straw	3000 lbs.	..	40	940	450
Oat straw	2700 ,,	..	36	970	324
Barley straw	2100 ,,	..	28	646	252

A variety of experiments on warmth, &c., instituted by Earls Spencer and Ducie, and William Childers, Esq., and their comparative results, with a series of valuable and well-digested facts, followed, which must necessarily be precluded from the pages of a report.

Various questions, bearing on different parts of the subject, were subsequently put to the speaker, which were answered with great perspicuity.

Owing to the time which was occupied in discussing the question, no specific resolution was adopted.

The unanimous thanks of the members were respectfully tendered to the introducer, for his kindness in consenting to undertake the subject, and the able manner in which he had expounded its various details.

Having thus noticed the various subjects for discussion, which have been considered principally in reference to the practical amount of information they convey, your committee, in resigning the charge with which they have been entrusted, beg leave to submit a few parting remarks.

Your committee rejoice in the increased interest manifested by the society, in the more regular attendance of the members at the monthly meetings—confirmed in their opinions as your committee are, that but little benefit can be derived from the society except by punctually watching its progress, they venture to hope that this improvement will be a source of permanent congratulation.

The accession of eighteen new members during the past year, and the acquisition of several valuable works to the library, are not less pleasing facts than omens of prosperity to the club.

Your committee also have pleasure in stating that the subscriptions of several gentlemen, who have hitherto supported the prizes awarded to "Cottage Allotment Productions," are continued; to which have been added the contributions of new members.

This enlightened liberality is a feature in the society, above all others, the most interesting; inasmuch as, independently of the direct encouragement afforded for habits of industry and good management, it involves the principle of preserving inviolate that bond of union between the promoters of such rivalship and the working classes, so highly essential to their mutual welfare.

The exhibition of roots, from the unfavourableness of the season, was not of that consequence which could be desired; but the cottage productions exceeded, both in quantity and quality, the most sanguine expectations of those present, and elicited a large amount of admiration.

The accounts of the treasurer, which have been examined, exhibit a balance of 3*l.* 6s. 4d. in favour of the club.

With these observations your committee close their report, in the pleasing anticipation that, as knowledge increases, and society becomes more awakened to the true state of its real interests, the value of agriculture will be increasingly appreciated, and its importance maintained with that consistency of principle and integrity of purpose which become those who regard it as their natural—their destined occupation.

On behalf of the committee,
Charles Lenny, Sec.
Wissett, near Halesworth, Nov., 1845.

SUCCESSFUL FARMING.

For judicious and economical management, few farms that we have ever visited will compare with that of A. Van Bergen, Esq., situated about three miles from Coxsackie landing. It consists of 700 acres, lying mostly in a body, about 500 acres being cleared, and the remainder wood-land. The nett proceeds from sales for the last ten years have been from 2,000 d. to 6,000 d. yearly.

The staple product is hay. About 300 acres are this year in mowing. The average yield is from a ton to a ton and a half per acre. The hay is pressed on the farm, and shipped to New York. The price obtained per ton in that market is from 10 d. to 16 d.

The mowing-grounds are laid out in large lots, thus obviating the expense and trouble of many inland fences. There are 212 acres in one field. One side of this field, embracing twenty to thirty acres, having the benefit of the wash from the highway, has been in grass for forty successive years, and has yielded annually from one and a half to two tons per acre. But the usual course is to break up the meadows once in four or five years, take a crop of corn and a crop of oats, and then seed down again with timothy and red-top. Top-dressings of manure are sometimes given; in connection with which the sward is scarified, some grass-seed sown if required, and the surface made smooth with the roller.

The mode practised by Mr. Van Bergen, in making hay, is deserving note. The grass is never cut while wet with dew or rain; thus, from its dryness, it does not pack in the swath, but is so light that it admits the air, and dries rapidly without being spread. From the swath the hay is put into small grass-cocks. This is done very expeditiously with large wooden forks—one man being able to accomplish more in this manner than three or four could with rakes. The next day the cocks are turned over for the moisture of the bottoms to dry off, which, in good hay weather, is all that is done before taking the hay to the barn. But, if there is a prospect of rain, the cocks are carefully doubled and trimmed. After the bulk of the hay—that is, what was put in cock—has been carried off, the scatterings are collected with a spring-tooth horse-rake—an implement which answers admirably for this purpose, as well as for another, of which we shall speak presently.

This mode of making hay we think a very cheap one, and it seems to answer well in this case. It should be remarked, however, that as Mr. Van Bergen sells his hay, a considerable object is to obtain the greatest *weight* with the least expense; most of the grass, therefore, is not cut till it has reached such a state of ripeness that the curing is effected with much less labour than it could be at an earlier stage.

Land under Cultivation.—Mr. Van Bergen has this year about 100 acres under the plough, viz., 32 acres in corn and beans (in alternate rows), 40 in fallow, with beans in rows ten feet apart, 8 in potatoes, 10 in oats, and the remainder in buckwheat.

The cultivation is admirably conducted; the work is done in the most thorough manner, and with the least possible expenditure. The soil, though of a character commonly called "strong," is not, on the whole, of a nature favourable to crops. A great portion of it is too flat; and it is mostly of a very tenacious texture, with a cold, compact subsoil, which does not admit of the free descent of water. For these reasons crops are liable to suffer both from the excess and deficiency of water. If there is much rain, the soil is made into mud, and from being thus run together, it bakes so hard when dry that the plants cannot extend their roots.

We mention these disadvantageous circumstances, as they serve to show in a more striking manner the superior skill and judgment used in cultivation. Against obstacles which really would have induced many farmers to relinquish the idea of obtaining profitable crops, Mr. Van Bergen has persevered, and has received for his well-directed labours an abundant "recompense of reward." Sixty bushels of corn per acre, and from forty to sixty bushels of oats, have not unfrequently been taken from such land as we have described.

That these crops have been obtained at small comparative cost, will be inferred from the fact that three men, under the direction of Mr. Van Bergen, have done all the hand labour of the farm, from the opening of spring to the 1st of June. The secret of accomplishing so much with so few hands, lies in the performance of much the greatest portion of the work by improved implements drawn by horses. We cannot give at this time a particular description of these implements and the manner in which they are used, but hope to obtain cuts before long, of some which we consider particularly valuable. It may be observed, however, that in cultivating the crops above-mentioned, Mr. Van Bergen uses no less than three kinds of ploughs, three kinds of cultivators, and a harrow, besides a spring-tooth horse-rake, which is made, in some instances, to do the work of a harrow in an improved style.

In ploughing, as well as in all the after-culture, particular regard is paid to adapting the work to the nature and tendencies of the soil. The first object is to obviate the difficulties arising from the water remaining too long on or near the surface. For this purpose the land is laid partly in beds with open channels so disposed as to facilitate, as much as possible, the discharge of the water. The land is next thoroughly subsoiled to the depth of fifteen to seventeen inches. In the course of culture, particular attention is paid to keeping the soil open, which is effected by the use of tools which penetrate and loosen to a considerable depth. The thirty acres of corn and beans which we have mentioned, were managed from first to last entirely without the hand-hoe; and yet we have never seen an example of more clean and perfect cultivation than the field presents. Mr. Van Bergen assures us that a man and a boy will readily tend forty acres of corn, on his system, in a season, and that too in the most thorough manner—not run over so as to have the ground full of "unclean things," as we have too often witnessed on the corn-lands of the west.

The bean crop of which we have spoken was planted with Lewis's seed-planter—an implement with which Mr. Van Bergen is much pleased. It is drawn by a horse, and does the work with great precision and dispatch. Mr. Van Bergen intends to use it hereafter for planting corn.

Mr. Van Bergen's fallows are managed on the true plan. The object is to clean the land, and this is done most completely. The land is alternately worked with cultivators, or "gang-ploughs," paring cultivators, and the spring-tooth horse-rake. The cultivators or gang-ploughs leave the ground in small ridges, a foot apart; the parers, which are narrow plates of steel, of lengths varying from one foot to three feet, are made to shave the surface, which levels the ridges and cuts clean all vegetation; the horse-rake, which is made of extra-sized wire to fit it for this purpose, follows after, rakes the ground smooth, collects weeds or grass where there is any, and leaves the ground in the most beautiful condition. These different operations are repeated in the course of the season at various intervals, as may be necessary to keep the soil clean and light. The last operation before sowing winter grain, is to put the land in the small ridges (as described before) by the gang-ploughs; on these ridges the grain is sown, and is then harrowed in with the horse-rake, which, running lengthwise of the ridges, brings the grain in regular rows, a foot apart.

The gang-ploughs and the largest sized cultivators, are drawn by two horses. Some of them work a breadth of nine feet at once, and a man and pair of horses will work over from fifteen to twenty acres of fallow land a day, with one of them. Mr. Van Bergen has lately made one still larger than those we have mentioned, which cuts a space of ten feet in width, and requires three horses to draw it. It is designed partly as a scarifier for grass-grounds, and partly to clean the foul growth from the fallows; and is at the same time so contrived that differently shaped tools may be readily fitted to it, so that at option it is metamorphosed from a scarifier to a mammoth cultivator, or set of gang-ploughs.

It may be observed, in passing, that Mr. Van Bergen makes considerable use of the subsoil plough in draining his grass lands. It answers in this case a similar purpose to the *mole plough*. The implement is passed through the sward in such places as would be likely to effect the most drainage; and a channel is thus made which not only takes the water from the surface of the land, but conducts it off to natural courses. The plough does not turn over the sward, but only raises it; so that the grass grows as well or better immediately over the channels as in other places. These spaces made by the subsoil plough remain open for two years, and are of great advantage.

Injury by the Wire-worm.—Mr. Van Bergen's crops have been greatly injured this year by the wire-worm. His wheat and corn have been almost totally destroyed; his oats have been considerably cut off, and even his beans have not escaped; and, judging from the numbers which on examination we found preying on their roots, their chance of affording a crop must be small indeed. He has not found any mode of counteracting their ravages.

Live Stock.—Three pair of horses are kept by Mr. Van Bergen, which perform all the team-work on the farm, as well as all other service required by horses. A yoke of oxen have formerly been kept, in addition to the horses; but this season their use has been discontinued.

A small stock only is kept. The cows, ten in number, are mostly Durhams, Ayrshires, and grades of these breeds. Several of the Durhams were imported. They are evidently of a milking family, and show excellent points for the dairy. The Ayrshires are very pretty stock—silky haired, clean skinned, small boned, with all the indications of first-rate dairy-stock. Mr. Van Bergen formerly fatted calves for the New York market. He usually sold them at from five to ten weeks old, and obtained for them an average price of 9 d. per head. He sold, one year, 160 calves fatted by himself. The business proved profitable for several years; but competition, after a while, reduced the profits, till it became no longer an object.

CONCLUSION.—Mr. Van Bergen's farming must, on the whole, be eminently successful. Many, very many farmers, even with greatly superior advantages of soil, do not obtain anything like as good crops on the average, or realize half as good profits on their capital invested in farming. What is the cause of this success? is the question obviously suggested. We answer, it is to be found in the fact that "knowledge is power." A mind well balanced, well disciplined, and discriminating, here exerts its energies; and the effect is seen in the systematic plan on which the various operations are based, and in the highly satisfactory pecuniary returns which are the ultimate results.—Albany Cultivator.

THE LAW OF SETTLEMENT.

SIR,—The much-debated question of the law of settlement, which has received much attention lately at your hands, has still some points which I think deserve to be more prominently brought before the public; and, with your leave, I beg to trespass on your columns for that purpose. Sir James Graham, in his speech of Feb. 11, 1845, as reported in the *Times*, says, "Adam Smith doubts, and with much reason, whether any poor man ever reaches the age of forty without experiencing hardship and injustice from the law of settlement. He thinks, and so do I, that it is monstrous for a poor man to be confined, as to his residence, his labour, or his rights, within the narrow limits of a parish or township." And yet, though a period of just seventy years has intervened since Adam Smith wrote the passage Sir James Graham quoted, the evil remains unredressed, and no material alteration, as far as it affects the situation of the working man, has ever been made. The effects of the operation of the law of settlement, by which any man who becomes chargeable to the poor rates is liable to be removed to the place of his settlement, no matter how long he may have left it, or how distant it may be, are of various kinds, and may be enumerated, for the sake of clearness, under the following heads:—

First, by preventing a man moving to better his condition. Under this head, could any greater obstacle be placed in the way of a working man, who might be desirous of moving to a distant part of the country, than the knowledge of the fact, that if he became ill, or if trade went badly in his new locality, and he were obliged to apply for relief, that immediately on his so doing, steps would be taken by the parish authorities to send him back to his settlement; and all this, perhaps, after some years of working at a mechanical or manufacturing occupation, which has rendered both the man himself and his family quite unfit for agricultural employment, which in all probability has been the one they have left in search of something better? We know by experience that families having once migrated from an agricultural to a manufacturing district, will endure almost any amount of privation rather than return to their agricultural birthplace, where nothing probably but the workhouse awaits them. But why require a man to submit to such privation? If it is right to relieve him in one place, it should be equally so in another. In following the course of trade, and moving from one town to another, a man is doing that which is equally to his own advantage and for the benefit of society generally.

Secondly, by driving men into the union workhouses, and throwing them out of employment, with the view to make them prove their settlement. This, in small parishes in the country, is by no means an uncommon occurrence. I have myself, in the union in which I live, heard of good labourers being discharged, and others taken in their places, for no other reason than that they did not belong to the parish where they were working. And besides the mere fact of a man's being thrown out of work merely because he is not settled where he is working, there is the moral deterioration in going into the workhouse to make himself chargeable by receiving parochial relief, if it be for one night only. The following entry in the books of the Swaffham Union Workhouse is a case in point:—" G— L——, Elizabeth his wife, Martha and Eliza, his children, came in June 20, 1845; went out June 21:" "came in to secure his settlement." In another part of the book, just previous, there is also the observation on a man and his family, who stayed but a short time in the house—"No work, no settlement." In the various petitions which were sent up to Parliament by different boards of guardians last year, there is frequent mention of the fact of good men being discharged from employ, not from any misconduct of their own, but simply on account of their settlement. What can be more degrading to a working man than this compulsory driving to parochial relief, and what so likely to habituate and render him a pauper? And this is the morbid influence, too, to which a man is subjected, not in this union or this district only, but in every part of agricultural England, through her fourteen thousand and odd parishes.

Thirdly, by preventing migration from agricultural districts. What labouring man, under the present law, except under circumstances of extreme pressure, is likely to leave his parish? And yet we hear of many parishes where there is a superabundance of labour, and farmers get afraid to see the law altered. There is at all times a tendency in people to move from the country to the town; and the nature of the employment being limited in the country for agricultural pursuits, and capable in the towns of great increase, it is natural that the migration should be in that direction. Anything which checks this natural flow from the country must of necessity operate very unfavourably on the price of labour in agricultural districts, and without any corresponding advantages to our large towns. The supply of labour in London for heavy work has been filled up by Irish, and the same in the large towns in the north of England, where, if English could have been had at even higher wages, they would have been preferred. But this question of keeping the Irish at home deserves a separate consideration. So long as the poor law is not the same in the two countries, it is obviously unjust to the English rate-payer to throw on him the burden of supporting the Irish; and on the English labourer the effect of the influx of Irish in cutting down his wages is tremendous. The redundance of labour, moreover, in agricultural parishes, has this peculiar effect—by compelling farmers to keep a larger number of men than they want, the tendency is to equalize the wages of the good and indifferent labourer, regard being had not to the quantity of labour performed, but to the number of men that can be kept off the parish. Nothing is more common than for a farmer to have a dozen men working for him all at the same wages, and yet the chances are that no two of those men are equal in point of work. But thus the matter stands: one man may be a very superior workman, but he belongs to the parish, and dare not and cannot leave his employer; and the farmer in the next parish won't employ him because he does not belong to him. This man then has to remain where he is on less wages than he is really worth. Again, another man may be a very ordinary workman; but he also belongs to the parish, and has a large family. His master dare not do without him, for he would cost more on the poor rates; and he pays him the same as he does the good man. Now, here are these two men, working side by side; and can we wonder at any complaints of the unequal reward of labour?

Fourthly.—By making a preference for married to single men it leads to early marriages. Here let me premise it is not my wish to deprecate early marriages; but if in the spirit of our laws there is anything that has a tendency to make the already early age at which our people marry more early than it otherwise would be, then I say that such is an error in legislation, and should be avoided. Nothing, perhaps, would have a greater effect in raising the wages of the working man than the deferring for a few years the age of marriage. By this means, if carried far enough and extensive enough, the working population might acquire an almost absolute control over wages, and fix them wherever they liked. But this is a point never likely to be arrived at. The tendency and the danger are all on the other side. The fear is, that we shall always have wages rather too low than too high, and that people will marry too early than too late. This being the case, it is certainly not our business to encourage by law early marriages. But how does this individual law operate? With the entire agricultural population, it is a certain discouragement to the single man. In the first reports of the Poor-Law Commissioners, the evil of paying the single man less than the married is frequently alluded to; and though the practice has somewhat diminished of late years, there are ways still left in which the law, as it at present stands, operates injuriously to the single man. Although there may be no great difference made between the wages of the single and married man while at work, yet the moment there becomes a scarcity of work, the single men are the first to be sent to the parish. If we look into our workhouses in the winter, when there are a good many able-bodied men in them, and ask whether they are married or single, the answer generally is that nine-tenths of them are single; and the reason they are there instead of the married men is, because they cost less than the married men to keep them. That this is a fact in the Swaffham Union I can speak to; and I have no doubt that other agricultural unions are the same. If the custom needed confirmation, the following extract from a letter which came into my hands a short time since, and was written by a large farmer in Norfolk, will give it. It was with reference to the character of a man, and concluded with the following passage—"I am sorry we have so many unemployed in this parish, and of course the single men are the most likely to be put on the parish, or sent to seek employ." Mr. Sheridan, in the House of Commons, a few weeks since, in quoting letters from relieving officers as to the rate of wages in Wiltshire, gives the following—"About Felton the rates of wages for single men are 6s.; for married men, 7s.;

house rent is high." This is evidence of the custom existing in other places besides Norfolk, and is testimony also of the redundance of labour in these parishes at the time. It is not to be wondered at that to escape from idleness, the workhouse, and half the ills of life, when the remedy is so simple and the law so imperative, a man under such circumstances should be driven to marriage.

Some may say, that whatever may be our laws and institutions, we can do but little in effecting a perceptible change in these matters. To such I would answer, laws and institutions are every thing; and though climate and the race of people we have to deal with are elements in our social system, still so pliable a thing is man, and so sensitive of liberty, that there is no law, however slight its deviation from the right course, that does not exert an influence accordingly for good or for evil.

From whatever cause it is brought about, nothing can be more curious than the great differences which exist in the age of marriage among different classes in this country, and in the great difference also between one county and another. In Mr. Farr's letter in the Registrar-General's Report for 1842, we are told that one-fifth of the people of this country, who attain the age of marriage, never marry; and that the women do not marry till they attain a mean age of 24·3, nor the men until they are 25·72; which shows that prudence prevails in England to an extent which had not been conceived, and which he says will be scarcely credited when stated in numbers. When we know that among the higher classes the average age of marriage is much later than that above stated, and that a much greater proportion than one-fifth never marry at all, we must be sure that the very early and frequent marriages are confined almost exclusively to the lower orders. The worse people are off, the earlier they marry, is a well known maxim. It is so with the Irish, and it is so with the more pauperised counties of England. In the Registrar-General's report for 1844, it appears that the per centage of men who marry under twenty-one years of age is, in the following counties, as stated below:—

Bedford	12.2 per cent.
Northampton . .	9.4 „
Cambridge . . .	9.2 „

While, selecting from the other extreme, and taking the counties where people marry the latest, it is as follows:—

Cumberland . . .	2.7 per cent.
Devon	2.0 „
Hereford	1.9 „

For which different state of things there must undoubtedly be a cause in all cases, though such cause may be apparently trifling, or may be more probably a number of causes combined, each in themselves small, and owing their existence to the soil, natural productions, or occupations of the people. How far these things have their origin in the spirit of our legislation, it is our business only to examine.

Fifthly.—By causing cottages to be pulled down and not rebuilt in small parishes, the law compels men to walk many miles to their work, and in the larger parishes to crowd more people into a dwelling than there ought to be. This is a common practice in the county of Norfolk. It has been noticed in the "Norwich Mercury" that there are men living within the bounds of the city of Norwich who have daily to walk many miles to their work in the country, merely because the owners of land in those parishes have succeeded in keeping down the number of cottages. The same thing takes place in many small towns to my own knowledge in the county of Norfolk; and the most glaring case which exists in the county is probably to be found in the parish of Castleacre. In that parish, according to a table furnished by Mr. Hudson to Mr. Denison, when making his report on the agricultural population, it appears that there were then in the parish 49 labourers with families belonging to Castleacre, and 103 labourers with families belonging to other parishes. The employment of these people was not confined to Castleacre, but was extended to many neighbouring parishes, of which a list was given, and whose resident population was insufficient to do all the work in their parishes. Those neighbouring parishes are mostly in the hands of large proprietors, who have the control of the number of cottages in each. Castleacre being what is called an open parish, and in the hands of a great number of small proprietors as far as the house property goes, has no power to prevent the increase of houses; and the population, which would naturally have been spread over the country where it was wanted, is thus compelled to live crowded together in a small spot, with a long distance to go daily to work. Mr. Denison, in speaking of this, says—"These last," that is, the small parishes, "partly in order to prevent an increase of birth settlement, and to keep down the rates, partly from an unwillingness to invest money in cottage property, not only allow no new cottages to be built, but let the old ones fall into ruin. The resident population of these parishes is thereby gradually reduced, as the labourers are forced to quit them, and come to reside in Castleacre." Mr. Denison further on says, "I believe those who first (unintentionally and unknowingly) caused the mischief, can alone cure it; I mean the neighbouring landowners." But it did not occur to Mr. Denison that these neighbouring landowners are not more than mortal, and that they are very glad to avail themselves of the opportunity which the law allows them of easing their estates of a large amount of poor rate. And though a few landowners are here and there to be found who may be anxious to do all they can in their individual capacity, yet the spirit of the law so militates against their exertions, and its effects are so general and extensive, that nothing can stand against it. The law is to blame, and not the landlords. It is estimated that in the county of Norfolk there are about as many small parishes under the control of one or more landlords, as there are parishes open to and belonging to many landlords. It is probable also, as the parishes in Norfolk are as large as they are in most parts of England, and as the same law prevails everywhere, that there is everywhere an inequality in poor rate, and an inequality in the number of houses, with reference to the quantity of land. Of the moral effects of the system, I may also quote Mr. Denison on this point. He says—"If those 103 stranger families, who now swell the amount of crime and misery at Castleacre, were living in their own parishes, subject to the control of their landlords, aided by their care and kindness, guided by their example, benefited by that chance contact with persons of birth, education, and station which indirectly tends to civilize—influenced, too, by that sense of shame which keeps a man straight when at home, who, 'in a far country,' would be 'a prodigal'—Castleacre would not be reproached as 'the coop of all the scrapings in the county;' its own native population would be uncontaminated by the refuse of other parishes; the gang system would necessarily cease; and Castleacre would no longer be what it now is—the most miserable rural parish I ever saw anywhere."

I am, sir, your obedient servant,

Swaffham, June 3, 1846. ARTHUR MORSE.

—Norwich Mercury.

ON THE PRINCIPLES OF ARTIFICIAL MANURING.

BY BARON VON LIEBIG.

If we compare the experience of farmers regarding the fertility of the soil and the quantity of its productions, we are surprised by a result which surpasses all others in general application and uniformity.

It has been observed, that in every part of the globe where agriculture is carried on, in all varieties of soil, and with the most different plants and modes of cultivation, the produce of a field on which the same, or different plants have been cultivated during a certain number of years, decreases more or less in quantity, and that it again obtains its fertility by a supply of excrements of man and animals, which generally are called manure; that the produce of the fields can be increased by the same matters, and that the quantity of the crop is in direct proportion to the quantity of the manure.

In former times scarcely any attempt was made to account for the cause of this curious property of the excrements of man and animals. Without taking into consideration the origin of the excrements, and the relation they bear to the food, it was not astonishing that their effect was ascribed to a remnant of vital power, which should qualify them to increase the vitality in plants. Ascribing their influence on the fertility of the fields to an incomprehensible occult cause, it was forgotten that every force has its material substratum; that with a lever, in a mathematical sense, which possesses no extension and gravity, no effect can be produced, no burden raised.

Guided by experience, which is the fundamental basis of all inductive science, and which teaches us that for every effect there is a cause, that every quality—as, for instance, the fertility of a field, the nourishing quality of a vegetable, or the effect of a manure--is intimately connected with and occasioned by something which can be ascertained by weight and measure; modern science has succeeded in enlightening us on the cause of the fertility of the fields, and on the effects which are exercised on them by manure.

Chemistry has shown that these properties are produced by the composition of the fields; that their fitness for producing wheat or some other kind of plants bears a direct proportion to certain elements contained in the soil, which are absorbed by the plants. It has likewise shown that two fields, of unequal fertility, contain unequal quantities of these elements; or that a fertile soil contains them in a different form or state from another which is less fertile. If the elements are contained in the soils in sufficient quantities, it produces a rich crop: if it is defective in one of them only, this is shown very soon, by the impossibility of growing in it certain kinds of plants.

Moreover it has been proved with certainty what relations these elements of the soil bear to the development of the plants. Chemical analysis has demonstrated that a certain class of these elements is contained in the seeds; others, in different proportions, in the leaves, roots, tubers, and stalks.

They are mineral substances, and as such, are indestructible by fire, and consequently remain as ashes after the incineration of the plants or of their parts. Many of these elements are soluble in pure water, others only in water containing carbonic acid, as rain water; all were absorbed from the soil by the roots of the plants in a dissolved condition. It has been shown that, if in a field those elements which remain after the incineration of the grain or seeds are present in an insufficient quantity, no wheat, no barley, no peas—in a word, none of those plants can be cultivated on that field, which are grown on account of their seeds. The plants which grow on such a field produce stalks and leaves; they blossom, but do not bear fruits. The same has been observed regarding the development of leaves, roots, and tubers, and the mineral elements which they leave behind after their incineration. If, in a soil in which turnips or potatoes are to be cultivated, the elements of the ashes of these roots are wanting, the plants bring forth leaves, stalks, blossoms, and seeds; but the roots and tubercles are imperfect. Every one of the elements which the soil gives up to the plants is in a direct quantitive proportion to the production of the separate elements of the plants. Two fields, which under otherwise equal circumstances are unequally rich in mineral elements of the grain, produce unequal crops. One containing them in larger quantity produces more than another containing them in less. In the same manner, the capacity of a soil to produce tuberculous plants, or such which have many leaves, depends upon its amount of the elements of the soil which are found in the ashes of those plants.

It results from this with certainty, that the mineral substances which are furnished by the soil, and which are found again in the ashes of plants, are their true food; that they are the conditions of vegetable life.

It is evident, that from a field in which different plants are cultivated, we remove with the crop a certain quantity of these elements; in the seeds, those mineral parts which the soil had to provide for *their* development; and in the roots, tubercles, stalks, and leaves, those elements which are necessary for *their* production. However rich the field may be in these elements, there can be no doubt that, by several cultures, it becomes more and more impoverished; that for every plant a time must arrive when the soil will cease to furnish, in sufficient quantity, those elements which are necessary for a perfect growth. Even if such a field, during many subsequent years, produced twenty-five or thirty-fold the amount of the seed—for instance, of wheat—experience shows that the crop gradually decreases, until at last the amount will be so small that it approaches the plant in its wild state, and would not repay the cost of cultivation.

According to the unequal quantity in which the mineral elements of grain, tubercles, roots, seeds, leaves are contained in a soil, or according to the proportions in which they may have removed in the crop, the land may have ceased to be fertile for roots and tubercles, but it may yet produce good crops of wheat. Another may not produce wheat, but potatoes and turnips may thrive well in it. The mineral substances contained in a fertile soil, and serving as food to the plants, are taken up by them with the water, in which they are soluble. In a fertile field they are contained in a state which allows of their being absorbed by the plant and taken up by the roots. There are fields which are rich in these elements, without being fertile in an equal proportion; in the latter case they are united with other elements into chemical compounds, which counteract the dissolving power of water. By the contemporaneous action of water and air—of the oxygen and carbonic acid of the atmosphere—these compounds are decomposed, and those of their constituent elements, which are soluble in water, but which had been insoluble by the chemical affinity of the other mineral substances, re-obtain the property of being absorbed by the roots of the plants.

The duration of the fertility of a field depends on the amount of the mineral aliments of plants contained in it; and its productive power for a given time is in a direct proportion to that part of its composition which possesses the capacity of being taken up by the plant. A number of the most important agricultural operations, especially the mechanical, exercise an influence on the fertility of the fields only thus far, that they remove the impediments which are opposed to the assimilation of the mineral food into the vegetable organism. By ploughing *e. g.*, the surface of the fields is renewed and made accessible to air and moisture. The nutritious elements contained in the soil in a latent state acquire, by these operations, the properties necessary for their transmission into the plants. It is easy to conceive the useful influence which, in this respect, is exercised on the produce of the fields by the care and industry of the farmer. But all these labours and efforts do not increase the amount of mineral elements in the field; in rendering soluble in a given time a larger quantity of the insoluble substances, and obtaining by these means a richer crop, the time is merely hastened in which the soil becomes exhausted.

The experience of centuries has shown that, with the help of manure, of the excrements of animals and man, with which we supply those fields which have ceased to produce crops of grain, &c., serving as food for man and animals, in a sufficient quantity, the original fertility can again be restored; an exhausted field which scarcely yielded back the seed is made to produce a twenty and more fold crop, according to the proportion of the manure provided.

Regarding the mode of action of the manure, it has been observed, that all excrements do not exercise an equal influence on plants. The excrements of sheep and cattle, for instance, increase in most fields the crop of roots and herbaceous plants to a far greater degree than those of men and birds (guano). The latter act far more favourably on the production of the cerealia, especially if they are added to the animal excrements, and are given to the fields at the same time.

A field, for example, which has lost its fertility for potatoes and turnips, but on which peas and beans still thrive, becomes far more fertile by a supply of the excrements of horses and cows, for a new crop of potatoes and turnips, than by manuring it with the excrements of man or with guano.

The most accurate experiments and analyses have pointed out that the excrements of man and animals contain those substances, to the presence of which the fertility of the soil is due. The fertilizing power of manure can be determined by weight, as its effect is in a direct ratio to its amount in the mineral elements of the food of plants. The truth of the result of these cheminal analyses must be evident to every one who inquires into the origin of excrements.

All the excrements of man and animals are derived from the plants of our fields; in the oats and hay which serve as food to the horses, in the roots which are consumed by a cow, there are a certain quantity of mineral ingredients. A horse, in consuming 15lbs. of hay, and 4½lbs. of oats per day, consumes 21 ounces of those substances which the hay and the oats took from the fields; he consumes annually 480lbs. of these constituent elements of the soil, but only a very small portion of them remains in his body. If a horse during one year increases 100lbs. in weight, this increase contains only 7lbs. of those mineral substances which were contained in the food. But what has become of the 473lbs. which we cannot detect in his body?

The analysis of the fluid and solid excrements which the horse gives out daily shows that the ingredients of the soil which do not remain in the body of the animal are contained in its excrements; it shows that in an adult animal, which from day to day does neither increase nor decrease in weight, the amount of the mineral ingredients of the excrements is equal in weight to the mineral ingredients of the food.

As with the horse, so it is with all animals. *In all adult animals the excrements contain the ingredients of the soil according to the quantities and relative proportions in which they are contained in their food.*

The mineral substances of the food which have remained in the body of the animals, and served to increase their weight, are found again in the bones and excrements of man who consumes the flesh of these animals.

The excrements of man contain the elements of the soil, of bread or of grain, of vegetables and meat.

These discoveries explain, in a most simple and satisfactory manner, the fertilizing effect which manure produces on our fields.

It is now obvious why manure renders again fertile the exhausted fields; why by its means their productiveness can be augmented; why the latter is in a direct ratio to the quantity of manure administered.

The exhaustion of the soil by subsequent crops—its decrease in fertility—is produced by the gradual removal of the mineral elements, in a soluble state, which are necessary for the development of our cultivated plants. By a supply of manure they are again restored to that state suited to serve as nourishment to a new vegetation. If the supply of the removed elements of the soil, by means of manure, be sufficient; if the quantity taken away be restored, the original fertility re-appears; if the supply be greater, the produce increases; a defective supply gives a smaller produce.

It is now explained why the different kinds of manure exercise an unequal effect upon the fields.

The excrements of man, and the guano, containing especially the mineral ingredients of grain and meat, exercise far greater influence on the amount of produce in grain in a field in which these ingredients are wanting, even if those of the leaves and stalks are present in sufficient quantity, than the excrements of an animal which feeds on roots or green fodder. The excrements of the latter contain the mineral elements of the leaves, stalks, and roots, in prevailing quantity, and have a greater value for the production of roots and foliaceous plants than those of man or birds, which contain only a small quantity of those mineral substances which they require for their development.

If we compare, for instance, the composition of guano with the excrements of the cow—solid and fluid excrements in the same state of dryness—it is found, that in an equal weight the latter contain five to seven times more of the mineral ingredients of turnips and potatoes than the former. If, in a soil which is deprived of all these mineral substances, we wish to force a crop of turnips by means of guano, we require at least five times more of guano than dung of cattle.

The same thing happens, though *vice versâ*, if we wish to produce a rich crop of grain by means of animal excrements; in this case, one part of guano and five parts of animal excrements produce the same effect as 13.15 parts of animal excrements.

To understand the proper meaning of these numerical proportions, it is sufficient to mention that 400 pounds of bones contain as much phosphoric acid as 1,000 pounds of wheat; these 400 pounds of bones can furnish sufficient phosphoric acid to 8 acres.

If we take the importation of bones into Great Britain in the last ten years to amount to one million of tons, enough phosphoric acid has been supplied to the fields for 25 millions of tons of wheat; but only a small proportion of the phosphoric acid of the bones is in a state to be assimilated by the plants, and applicable to the formation of the grain. The plants, in order to apply the other far greater part of that phosphoric acid to their formation, must find a certain quantity of alkaline bases besides the bone earth, which are not given to the plants in the bones, because they contain neither potash nor soda.

To have increased the fertility of the fields in the right proportion, 800,000 tons of potash ought to have been added to the one million of tons of bones, in a suitable form.

The same is the case with guano; 60 to 100 pounds of it are sufficient to furnish phosphoric acid to one acre of turnips; but the four to eight fold quantity is required to furnish the turnips with the necessary alkaline bases, and it is still doubtful whether they can be at all provided with the latter by means of the salts with alkaline bases which the guano contains.

At a time when the necessity of the mineral substances for the growth and development of the plants, and the direct relation which the effect of manure has to its amount of the same substances, had not been ascertained, a prominent value was ascribed to the organic matters which it contains. For a long time it was thought that the produce of a field of those substances, containing nitrogen, which serve as food for man and animals, stood in a direct proportion to the nitrogen contained in manure. It was believed that its commercial value or its value as manure might be expressed in per cents. by its proportion of nitrogen, but later and more convincing observations have induced me to contradict this opinion.

If the nitrogen and carbonic acid formed by the decay and decomposition of the vegetable ingredients of manure were the cause of its fertilizing power, this ought also to be seen if the mineral substances are excluded. Direct experiments have shown that the nitrogen of the excrements can be assimilated by the plants, in the form of ammonia; but that ammonia, as well as carbonic acid, although it is indispensable for the development of all plants, can accelerate the growth of plants and increase the produce of a field of grain, roots, and tubercles only if at the same time the mineral ingredients contained in the manure which is applied are in a state in which they are suited for assimilation. If the latter are excluded, carbonic acid and ammonia have no effect on vegetation.

On the other hand, experience has shown that on many fields the produce which is rich in carbon and ammonia can be increased to an extraordinary amount without any supply of such matters as furnish these substances.

On fields which are provided with a certain quantity of marl or slacked lime, or with bone earth and gypsum—substances which cannot give up to the plants either carbon or nitrogen—rich crops are obtained, in many places, of grain, tubers, and roots, entirely in contradiction with the view which ascribes the effect of the manure to its amount of ingredients containing nitrogen or carbonic acid.

To explain this process, which is so opposite to the common opinion, the marl, the lime, the gypsum, the alkalies, and the bone earth were regarded as stimulants, which acted on the plants like spices on the food of man, of which it was believed that they increased the power of assimilation and allowed the individuals to consume larger quantities of food.

This view is contradicted if we consider that stimulants mean such substances as do not serve for the nourishment of the organism or for the formation of organic elements, and can only increase the weight of the body if at the same time a certain increase of food is given. In supplying the fields with the above mentioned substances the weight of the plants became increased in all their separate parts, without their having been provided with the quantity of food, which, according to theory, was necessary to this extraordinary increase, viz., with carbonic acid and ammonia.

Chemical analysis shows that these so called stimulants are either actual ingredients of manure, as gypsum, bone earth, and the active substances of the marl, or that they are the means by which the mineral elements contained in the soil are resolved into a state adapted for being assimilated by the plants; this is generally effected by the application of slacked lime. They consequently exercise on the vital process of the plants not a mere stimulus like the spices, but are consumed for the development of the leaves, seeds, roots, &c.; they become constituent parts of them, as can be shown with certainty by chemical analysis.

The success which has followed the application of these substances to the fields has explained, in a most striking manner, the origin of the carbon and nitrogen in the plants.

In the marl, in the bone earth, in the gypsum, in the nitrate of soda, no carbon is provided to the fields; and yet, in many cases, the same produce, in some even a higher one was obtained, than by the application of a manure containing carbon and nitrogen. As the soil after the crop does not contain less carbonaceous or nitrogenous substances, it is evident that these products which had been obtained without any carbonic or azotic manures, must have got the carbon and nitrogen of their leaves, roots, and stalks from the atmosphere; it follows, therefore, that the productiveness of the fields cannot be in proportion with a supply of carbonaceous and azotic substances, but that the fertility depends only on the supply of those ingredients which should be provided by the soil.

The soil does not only serve the purpose of fixing the plants and their roots; it participates in vegetable life through the absorption of certain of its elements. If these elements are present in sufficient quantity and in appropriate proportions, the soil contains the conditions which render the plant capable of absorbing carbonic acid and ammonia from the air, which is an inexhaustible storehouse for them, and renders their elements capable of being assimilated by their organism.

The agriculturist must, therefore, confine himself to giving to the field the composition necessary to the development of the plants which he intends to grow; it must be his principal task to supply and restore all the elements required in the soil, and not only one, as is so frequently done; the ingredients of the air, carbonic acid and ammonia, the plants can, in most cases, procure without man's interference: he must take care to give to his field that physical condition which renders possible and increases the assimilation of these ingredients by the plant; he must remove the impediments which diminish their effect.

The favourable influence which bone earth, gypsum, nitrate of soda, exercise on the fields has induced many farmers to the belief that in applying them they can dispense with manure or with the other elements of the soil; it requires, however, only little attention to see the great error of this opinion. We observe that the effect of these substances is not equal on all fields; in one place the amount of produce is increased by the lime, by the bone earth, and by gypsum; in another country, or on other fields, these substances in no way favour vegetation. From this arises the contradictory views of farmers regarding these matters as manures. If one farmer thinks the liming of his fields quite indispensable for rendering them fertile, another declares that lime produces no effect at all.

The reason of this difference is very simple. The examination of a soil upon which lime has had no effect shows that it was already rich in this substance; it further shows that its effect extends only to those kinds of soil in which lime is wanting, or in which it is found in too small a quantity, or in a condition which is not suited to its assimilation by the plant. Lime especially serves for resolving the silicates of alumina (clay), and consequently it cannot fertilize soils in which clay is wanting—for instance, sandy soils. It must be apparent to every one, that on the calcareous and gypseous fields of France and England one-half per cent. of gypsum or lime can have no influence at all on vegetation. This can be said with equal justice of bone ashes, and of every other mineral substance serving for the nourishment of plants.

If these substances exercise a favourable effect, some of the constituents of the soil or manure are restored which are indispensable to the nourishment of plants, and which have been wanting in the soil. If this be the case the other bodies, equally necessary, must be present in sufficient quantity. On a field in which sulphate of lime has acted favourably, and in which clover had been cultivated as fallow without it, the crop was 2200 pounds of clover hay, in which 53 pounds of potash were removed. On the same field, after it had been gypsed, 8,000 pounds of hay were produced, which contained 191 pounds of potash. If this potash had not been present in the soil, the gypsum would have had no effect—the crop would not have been increased. On fields which are richly provided with all the other mineral ingredients, with the exception of gypsum, the latter is applied with the greatest success. But if gypsum is present in the soil, the same effects are produced by ashes and lime, as is the case in Flanders. On fields in which phosphate of lime is wanting, bone ashes increase the produce of grain, clover, or grass; and on argillaceous soil, lime produces a decided improvement. All these substances act only on those fields which are defective in them, and if the other elements of the soils are present: the latter cause the former to come into action, and *vice versâ.* The farmers who thought that by using lime, gypsum, bone earth, &c., they might dispense with animal manure, very soon observed that their fields deteriorated. They observed that after a third or fourth successive manuring with those simple substances the produce decreased; that, as is the common expression, the soil became tired of the manure, that at last the field scarcely produced the seed.

It is evident from this, what is the action of the mineral elements in the soil. If in fact, in the first years, the produce of the soil had increased by the application of bone ashes, or by a single element of the manure—if this increase was dependant on the amount in the soil of the other mineral elements, a certain quantity of those was annually taken up by the plants and removed in the harvest; and a time must at last arrive in which it is exhausted by the repeated removal; the soil must become barren, because of all removed elements, only one or the other, and not all of them in a right proportion, have been restored.

The right proportion of the supply is, however, the only true scientific basis of agriculture.

If we subject the fluid and solid excrements of men and animals to an exact analysis, and compare the elements of them according to their weight, some constant relations between these elements impress themselves upon the mind, the knowledge of which is of some importance.

If the excrements of an animal are collected with some care, and left to themselves for some days, their nitrogen appears to have been converted, more or less perfectly, into ammonia. In the fluid excrements, in the urine, the salts of the food, which are soluble in water, are found in the form of alkaline carbonates, or of sulphates, phosphates, and other salts, with alkaline bases. In the solid excrements or fæces, silica, if it was contained in the food, earthy carbonates, and phosphates, are the principal ingredients.

The quantity of alkaline carbonates bears a certain proportion to the amylum, sugar, pectine, or the gum of the food. The urine of an animal which has been fed with potatoes or turnips is rich in alkaline carbonates. The potatoes, however, consist principally of amylum; the chief ingredients of the turnips are sugar and pectine. The urine of a horse which has been fed with hay and oats is relatively poor in alkalies if compared with the former.

It is further shown that the ammonia or the nitrogen of the excrements bears a certain proportion to the phosphates; the azote increases or decreases with the quantity of the phosphates in a manner that both can serve as a measure for each other, although not quite as an accurate one. It is not quite accurate, because the gum and the amylum also contain a certain, though small quantity of phosphate of lime, as has been proved in my laboratory.

The ammonia of the excrements is of course derived from the nitrogenous substances in the food; the phosphates are likewise constituents of the latter. In the composition of the food an equally constant proportion exists between both. A given weight of gluten or casein in peas or in grain always corresponds with a certain weight of phosphates. If the grain or the vegetable is rich in those azotic products of vegetable life, it is also rich in phosphates. If it is deficient in them, the quality of the latter decreases in an equal ratio.

As the amount of nitrogen in manure is a measure for its amount in phosphates, and as manure contains besides these also the other ingredients of the soil which are required by the grain or by the other vegetables for their development, and taken up by them from the soil, it is easily conceived what was the cause of the error in regarding the azote of the manure as the principal cause of its efficacy. The reason was, that the ammonia of the manure is always accompanied by the mineral elements which affect its nourishing qualities, because they render its assimilation into the organism of the plant, and its transition into a nitrogenous constituent, possible. Without phosphates, and without the other mineral elements of the food of plants, the ammonia exercises no influence whatever upon vegetable life.

If it has been shown that the fertility of the soil depends on certain mineral substances; if the restoration of the fertility of exhausted fields by means of the excrements of man and animals depends upon their proportions of these matters; if the effect of the manures accelerating the vegetation depends upon their proportions of ammonia, it is clear that we can only dispense with the latter when we provide all efficacious elements exactly in those proportions and in that form most proper for assimilation by the vegetable organism in which they are found in the most fertile soil or in the most efficacious manure.

According to our present knowledge of the effect of the constituent parts of manure, I feel convinced that it is indifferent to the plants from which source they are derived. The dissolved apatite (phosphate of lime) from Spain, the potash derived from the felspar, the ammonia from the gas works, must exercise the same effects on vegetable life as the bone earth, the potash, or the ammonia, which we provide in manure.

We live in a time when this conclusion is to be subjected to a comprehensive and accurate trial; and if the result corresponds with the expectations which we are entitled to make, if the animal excrements can be replaced by their efficacious elements, a new era of agriculture must begin.

I invite the enlightened farmers of England to unite with me for that purpose, and to lend me their aid. Whatever may be the result of these experiments, it is necessary for the future prosperity of agriculture that they be made. They will enrich us with a number of valuable facts; we shall ascertain where we have wasted efficacious matters in the common course of farming; we shall acquire an exact knowledge of those substances which are necessary, and of those which are dispensable.

For a number of years, myself and many young talented chemists have been occupied with the analyses of those mineral substances which are constituent elements of our plants of culture, and with the examination of the excrements of man and animals, as well as of a great number of soils acknowledged as fertile. These labours have been laid before the scientific world long since, but only a very confined application has been made of them in agriculture.

The farmer is, by his position, not in the condition to procure and to command the efficacious elements necessary for the restoration and increase of the fertility of his fields in a right proportion and suitable form. For this purpose, science and industry must combine their aid.

I have been fortunate to remove the difficulties which are opposed to the application of a mere mixture of the elements of manure. If we employ the different elements of manure exactly in those proportions in which they are necessary, according to experience, for a rich crop of wheat, peas, turnips, potatoes, and if, at the same time we leave them in their common state, they do not produce that effect which we might have expected, the cause of this is, that the different elements of manure possess a very unequal solubility; the ammonia evaporates, the soluble elements are carried off by the rain, and the effect is more in proportion with the amount of those ingredients of the manure which are less soluble.

I have found means to give to every soluble ingredient of manure, by its combination with others, any degree of solubility, without altering its effect on vegetation. I give, for instance, the alkalies in such a state as not to be more soluble than gypsum,* which, as is well known, acts through many years, as long as a particle of it remains on the acre.

The mixture of the manure has been adapted to the mean quantity of rain in this country; the manure which is used in summer has a greater degree of solubility than that used in winter. Experience must lead to further results; and in future the farmer will be able to calculate the amount of produce of his fields, if temperature, want of rain, &c., do not oppose its coming fairly into action.

I must, however, observe that the artificial manures in no way alter the mechanical condition of the fields, and they do not render a heavy soil more accessible to air and moisture. For such fields, the porous stable manure will always have its great value: it can be given together with the artificial manure.

All manure which is to be used during the winter contains a quantity of ammonia corresponding with the amount of nitrogen in the grain crops which are to be grown. Experiments in which I am at present engaged will show whether in future times the costs of this manure can be greatly lessened by excluding half or the whole amount of ammonia.* I believe that this can be accomplished for many plants—as for clover and all very foliaceous vegetables, and for peas and beans; but my trials are not so far advanced as to prove the fact with certainty.

Giessen University, 1845.

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* Equal parts of carbonate of potash and carbonate of lime (chalk), melted together, will dissolve in 460 parts of water. Increase of chalk lessens, while a larger proportion of the other ingredient increases the solubility. E. N. H.

* Dr. Krocker, in this laboratory, has determined, in the course of the last term, the ammonia present in moist soils of great varied physical properties. The results are still unpublished; but he remarked to me one day that if the ammonia per centage of the soil then in hand be estimated as constant through a depth of one foot, the ammonia in an acre was about 8,000 lbs!

Even in sand destitute of soluble mineral salts, and nearly so of organic matter, he found a per centage that was startling. Indeed, the sum of his results is that the ammonia is in nearer relation to the moisture than to anything else.

I found ammonia in the glaciers that come down from heights of 14,000 feet above the level of the sea—from near the summit of Mont Blanc. Even at that height the ammonia is still in quantity that may be weighed. Every rain and snow storm brings this ingredient to the earth. Every soil that can retain its moisture will also retain the ammonia that descended with it. Hence one cause of superiority of a soil containing much decayed vegetable matter or much humus. It enables it to hold moisture, as well as furnish a source of carbonic acid. A rod dipped in muriatic acid and held near the surface of a handful of moist soil will cause white fumes to rise, occasioned by a combination of the ammonia with the muriatic acid. A gentle breath directed along the surface of the earth experimented with will render the fumes more apparent. E. N. H.

REPORT ON THE CONTINUED EFFECTS OF CERTAIN SPECIAL MANURES.

(Communicated by the Turiff Agricultural Association.)

Drawn up by Mr. ALEXANDER MURRAY, Nethermill, of Cruden.

I. FARM, SLAP; TENANT, MR. WILLIAM MURRAY.—CROP 1845.

Table of Results on New Grass, Third Year of the Rotation.

No.	MANURES.	Dry Weight per imperial acre.			Increase of Dry Weight per imperial acre.		
		cwt.	qr.	lb.	cwt.	qr.	lb.
1	Bone-dust	21	1	12	9	1	20
2	Bone-dust and sulphuric acid	19	2	4	7	2	12
3	Guano	15	2	4	3	2	12
4	Farm-yard manure	18	3	20	7	0	0
5	No application	11	3	20	0	0	0
6	Farm-yard manure and bone-dust	22	1	20	10	2	0
7	Farm-yard manure and bone-dust, and sulphuric acid	19	1	8	7	1	6
8	Farm-yard manure and guano	22	0	0	10	0	8
9	Peat and saline manures	17	0	16	5	0	24
10	Farm-yard manure and saline manure	21	1	24	9	2	24

The grass was cut on 15th July, and weighed on 28th August.

OBSERVATIONS.

July 6.—No. 1. Rye-grass, dark green, short and bushy; white clover abundant.

2. Very similar to No. 1.

3. Rye-grass strong, not so bushy as Nos. 1 and 2, nor equal in white clover.

4. Better than Nos. 1, 2, and 3 in rye-grass and red clover, but not equal to Nos. 1 and 2 in white clover.

5. Worst on the field, very inferior.

6. Rye-grass good, rich in white clover.

7. Equal to No. 6.

8. Inferior to Nos. 6 and 7.

9. Not equal to No. 8.

10. Rather better than No. 5, inferior to all the others.

August 28.—The hay was prepared in the English method, and great attention was paid to it in consequence of rainy weather at the time, which delayed the weighing. It was quite dry at the time of weighing. The aftermath was very inferior. It was depastured with cattle. The grass, after farm-yard manure, showed some superiority over the others.

II. FARM, FINDON; TENANT, MR. JAMES STRACHAN.—CROP 1845.

Table of Results on New Grass, Third Year of the Rotation.

No.	MANURES.	Dry Weight per imperial acre.			Increase per imperial acre.			Decrease per imperial acre.		
		cwt.	qr.	lb.	cwt.	qr.	lb.	cwt.	qr.	lb.
1	Bone-dust	40	2	8	0	0	10	0	0	0
2	Bone-dust and sulphuric acid	39	1	4	0	0	0	1	0	22
3	Guano	42	0	24	1	2	26	0	0	0
4	Farm-yard manure	40	3	8	0	1	10	0	0	0
5	No application	40	1	26	0	0	0	0	0	0
6	Farm-yard manure and bone-dust	44	0	10	3	2	12	0	0	0
7	Farm-yard manure and bone-dust, and sulphuric acid	39	3	10	0	0	0	0	2	16
8	Farm-yard manure and guano	40	2	24	0	0	26	0	0	0
9	Peat and saline manures	36	3	21	0	0	0	3	2	5
10	Farm-yard manure and saline manure	40	2	4	0	0	6	0	0	0

The grass was cut on 8th July, and weighed on 1st September.

OBSERVATIONS.

Scarcely any difference could be observed on any of the experimental plots throughout the summer. The rye-grass, and red and white clover, were luxuriant and well mixed. The hay was made in the English method, and care was taken to have it properly dried before it was weighed.

The aftermath was short, and depastured by cattle. No apparent difference could yet be detected.

III. FARM, ROTHIEBRISBANE; TENANT, CHAS. CHALMERS, ESQ., OF MONKSHILL.—CROP 1845.

Table of Results on New Grass, Third Year of the Rotation.

No.	MANURES.	Dry Weight per imperial acre.			Increase per imperial acre.		
		cwt.	qr.	lb.	cwt.	qr.	lb.
1	Bone-dust	23	0	16	15	1	1
2	Bone-dust and sulphuric acid	25	0	6	17	0	19
3	Guano	21	3	8	13	3	21
4	Farm-yard manure..................	22	2	20	14	3	5
5	No application	7	3	15	0	0	0
6	Farm-yard manure and bone-dust	22	1	16	14	2	1
7	Farm-yard manure and bone-dust, and sulphuric acid....................	20	1	22	12	2	7
8	Farm-yard manure and guano........	22	3	7	14	3	20
9	Peat and saline manures	15	0	20	7	1	5
10	Farm-yard manure and saline manure..	16	0	16	8	1	1

The grass was cut on 17th July, and weighed on 5th August.

OBSERVATIONS.

July 4.—1. Rye-grass short, but green and bushy, with a thick sole of white clover.

2. Similar to No. 1, light crop of red clover.

3. Sole of rye-grass, inferior to Nos. 1 and 2, deficient in white clover.

4. Rye-grass stronger than on Nos. 1, 2, or 3, white clover better than No. 3, but inferior to Nos. 1 and 2.

5. Decidedly worst on the field, very short and open sole of grass.

6. Similar to No. 4.

7. Rather better in white clover than No. 6.

8. Scarcely equal to Nos. 6 and 7, but better than No. 3.

9. Rather better than No. 5, but inferior to all the others.

10. A very little better sole of grass than No. 9.

From the result of the three years' experiments of the rotation, the following conclusions may be drawn:—

1st. Farm-yard manure with guano, seem to give the greatest bulk of crop, and a heavier crop than a full manuring of either alone.

2nd. Farm-yard manure with bone-dust, or bone-dust and sulphuric acid, produce heavier crops of turnips and oats than a full manuring of either alone.

3rd. Notwithstanding the weight of hay crop, after the bone-dust, or bone-dust and sulphuric acid, appears about equal to that raised by the other applications, still they uniformly produce the best sole of rye-grass and white clover. This may be accounted for in two ways. 1st, Much more phosphates are added to the soil by a full manuring of bone-dust, or bone-dust and sulphuric acid, than from farm-yard manure or guano. The same result holds good with mixtures of these. 2nd. The texture of the soil is much firmer in the turnip crop after bone-dust, or bone-dust and sulphuric acid, than after farm-yard manure or guano. Now, experiment and experience have proved, of late years, that the texture of the soil has much influence in the growth of clover.

4th, The addition of sulphuric acid to bone-dust appears to accelerate the growth of vegetables. This is an important circumstance for wet, cold, clay soils. I find that a less quantity of sulphuric acid, along with bone-dust, than that used by the Turiff experiments—say, 6lbs. instead of 25lbs. to the bushel—has all the advantages of early action, and is free from the objections to so large a proportion.

5th. With regard to farm-yard manure, or peat and saline manures, they fall behind the other applications after the first year. This may arise from the saline manures being easily dissolved, and thereby early appropriated by the plants.—Journal of Agriculture.

WEALD OF KENT FARMERS' CLUB.

The last monthly meeting of this society was held at the Bull Inn, Cranbrook, in June, R. Springett, Esq., of Finchcox, in the chair, when the discussion on the best construction of oasts, and the best mode of drying hops, was resumed. Before entering into this evening's discussion, however, it will be requisite to give that of the previous meeting, on this question, which had been held at the George Inn.

At the monthly meeting on the 5th ult., at the George Inn, Cranbrook, Mr. Barnes took the chair; Mr. Buckland, hon. sec., and between 30 and 40 members were present.

The subject for the evening's discussion—the best method for picking and drying hops—was then proceeded with.

Mr. UNICUME said the oast should be in the highest convenient spot, and circular, and detached from any other building, so as to avoid any impediment to a good draught. At first there should be but little fire, and the fire should never be suffered to sink. A good supply of brimstone was desirable to give colour, not less than half a cwt. to a ton, which should be continued all the way through the process; and the hops he thought should be packed rather warm.

Mr. J. UNICUME agreed very much in all his brother, the last speaker, had said. His own was a square oast, without any plate over the fire; from which, to the hair, the distance was nine feet. His hair comprised 180 square feet to each fire, which would take 100 bushels at each loading. The more air in the oast the better. His oast originally had air holes 18 in. by 12 in., above the fires. They did not seem to answer, and he plastered them up, after which the oast did much better.

Mr. J. BUCKLAND (Biddenden) thought the great point in drying was to make as much air as possible go through the fire.

Mr. JUDGE said, in 1845 his father built an oasthouse under the superintendence of Mr. John Read, which was almost the first on the cockle principle. It had two drying-floors on a level, 18 ft. by 20 ft,—making, in the whole, 720 ft.; and it would take that number of bushels to the day's drying. Half a bushel per foot was rather a light oasting; but whenever he attempted to increase it, he invariably found it did not answer so well. When the cockles became dilapidated, they were taken down, and horse-fires substituted. In doing this it was necessary to excavate the bottom floor; and two fires instead of one were put into each oast. He found, by this means, he could dry an additional quantity; but the sample was not quite so good. He preferred the air to come through the fire, to effect which it was necessary to have a pipe or conductor; and the longer it was, the sharper the draught. Packing could not be done too warm if the leaf was not broken, which, with the packing machine, was not likely to occur. As for brimstone, at first he used from half to three quarters of a hundred, and when full ripe, a cwt.

Mr. TURLEY (Rolvenden) used from half to a hundred weight of brimstone, averaging perhaps 100lb., putting the greater part in the first firing. He always wished his hops to be picked singly, but he never got it done. The more brimstone the better the draught, and the less fuel; and it did not lessen the weight. The sifting should be done warm without rubbing.

Mr. PILCHER said his management was very similar to those he heard described.

Mr. BUTLER described an oasthouse he had built in Mid Kent against a bank, the ground on one side being level with the fire. He apprehended a difficulty in procuring a draught on that side, but in answered better than any oast he had ever built. He had air holes all round 18 in. by 12 in. There were a thousand feet of hair, on which they could dry a thousand bushels a day; and, though the occupier at first doubted if the oast would answer, he soon found it would, as his dryer said—"You may bring as many hops as you like, master, I'll dry them." The principle was to get as much air as possible into the oast, warm it, and drive it through the hops. He quite concurred in the preceding observations as to picking and packing.

Mr. HAGUE said about fifteen years ago he had altered an oasthouse on the principle of a first-rate building erected by Mr. Field, of Loose, which acted very well, and he should say he dried more hops with the least fuel of any man in that county. The fires were "horsed" over with bricks, with openings at the sides to expand the heat and soften it. There was plenty of air draught. Above the hair, which was seven feet from the fire, was another garret hair, which he thought was exceedingly desirable; and the top hops always made the lower hops a better sample. The top hops were left double the time of the lower hops; and about two hours from the latter coming off, those above were thrown down and mixed with them. As to the result he would only tell them that both factors and merchants highly approved them; and one person picked them out the first time, three times running, out of 1600 samples. The first hair contained 600 feet; and, by the aid of the garret hair, they dried from 800 to 900 bushels with less fuel than they had ever used before. The draught of air carried off the reek, and he thought the garret hair caused the heat to be retained the longer. He used half a ton of Welsh coal to a ton of hops, with a small proportion of charcoal.

Mr. BUCKLAND, the hon. sec., having prepared his report on the visit of the deputation to the farms of Mr. Davis and Mr. Mechi, it was agreed to defer the hop-drying subject till the next meeting. The report was then read, and Mr. Buckland asked leave to defer its publication till the next meeting. This was agreed to, with the understanding that some notice should also be taken of the practice of Mr. W. Barnes, of Staplehurst, which the club had been invited to inspect. A vote of thanks was also, on the motion of Mr. John Hague, passed to Mr. Davis, Mr. Mechi, and Mr. Barnes, for their invitations, and the meeting adjourned.

At the last meeting,

The CHAIRMAN, after expressing his regret that other engagements had prevented his attendance at the last two meetings, said that he believed that oast-houses ought always to be separate buildings, in case of fire. In respect to the question between open fires and cockles, he said that he preferred cockles. In some of the oasts which had come into his hands, he had found open fires with hairs, but they had found the hops dried cleaner and better by the cockles; and they had consequently had cockles placed in those oasts. This might possibly be attributable to the fact of their always using wood for fuel, as they never burnt coals. It required a large quantity of wood, but the question was, whether it was not cheaper than coal, where the planter grew much of it himself. He thought wood fuel gave the hops a better colour than coal. With regard to the shape of the kiln, he had always preferred a square shape; which had this advantage, that if it were requisite to increase the number of kilns, one side of the kiln was already formed. With round oasts they had not that advantage. Another thing which he thought of considerable importance, was to have plenty of cooling room. In many oasts he had found the cooling room to be very small, and he was afraid in some cases they were packed too warm; which, he believed, was considered by the factors to be very injurious to the quality. He thought it was best to pack the hops dried on one day or the following morning, or to pack those which had been dried early in the morning; at all events not before the evening of the same day. In his oasts, the hot air was conveyed, by double rows of flues, completely round the wall, which he thought conveyed the heat more equally over the whole building than by any other mode. The oasts he dried in were fitted with tiles, which, although more expensive at first, were, he believed, much better for the hops than the hair, and would last a very long time. The tiles were generally about 12ft. above the fires. In some cases they had been only nine feet, which he deemed too near, as the hops were in danger of being burnt; and consequently they had been raised to twelve feet. One very important operation in producing a good sample of hops, was the picking. It was very difficult to get their hops picked clean; indeed, almost impossible, unless proper people were got to do them. He never employed strangers, but always employed their own workpeople. It was a great advantage to have the same people every year, as they took a greater interest in doing their work well. No doubt many were compelled to employ strangers; but he always thought that where complaints existed between the masters and the pickers, there must be something wrong. They had, when employing their own people, never had any trouble or dissatisfaction, and had never even fixed the price which they intended to pay. Even in the last season, whilst there was dissatisfaction on almost every hand, they had never been asked, by a single man, what they were going to pay; and he believed their pickers had been as well satisfied as any pickers in the neighbourhood. The only way to have hops picked well was, to employ good pickers. With reference to sifting, the chairman said, that many people never sifted their hops at all, and he was not prepared to say whether it was better to sift them or not. He generally himself sifted them in wooden sieves, which he thought did their work better than wire. As regarded treading, they kept three men constantly engaged in packing. He had been told that it would be of great advantage to have a packing machine, but his father was opposed to machinery, when the operation could be performed by manual labour.

Mr. WHITING begged, not as a hop-grower, but as a member of the Maidstone Farmers' Club, in which this question had been frequently discussed, to make an observation or two on the scientific part of the question; and to state to the members what were the opinions of some of the most practical and intelligent hop-planters of Mid Kent on some of the points which had been touched upon by their excellent chairman. The drying of the largest quantity of hops in the smallest period could only be effected by considering the operation in a philosophical point of view. The most economical mode of drying was, to pass as large a body of air as possible through the hops; as the air, even in its ordinary state, absorbed the moisture. The easiest mode of raising a wind for this purpose, was that of lighting a fire in a large hollow tube, which ought to be the shape of an oast. The air, having free access at the bottom, was heated by the fire, and became lighter than the atmospheric air surrounding it. It then rose in the tube, other air rushed in at the bottom and sides of the fire to supply its place; this new air rose in its turn, and in this way a continuous stream of air was kept rising through an oast with open fires, and through the hops which lay on the hair, until the hops were dried. The great object was to get as large a body of air as possible to pass up rapidly through the oast. This could only be accomplished by allowing a free access of air to the fire from every direction. It was not necessary that all the air should be warm, so long as it was dry; as it was well known to laundresses that linen would dry in the wind better in a cold winter's day, than in a moist hot summer's day; and, although heat was essentially necessary to "kill the strig," as it was termed, yet he believed that it would be some day found that hops might be dried best at a low temperature. A circular kiln was much the best for admitting the free passage of a rapid draught of air, as all fluids, in passing through tubes, had been ascertained by experiment to proceed in a spiral course. For this reason, he believed, the best growers of Mid Kent had adopted the circular-shaped kiln, notwithstanding that the square kiln gave the advantage mentioned by the chairman; and in cases where he had seen oasts in which the dryers could not "get the reek off," they were generally square, and the reek had accumulated in the corners, the current of air taking its spiral course through the centre of it. The best oasts of the ordinary circular construction which he had seen, were those of Mr. Robert Golding, of Hunton, which were of about eighteen feet in diameter, and each of which was heated by a single open fire let down into the floor of the kiln, about twelve feet from the hair, the current of air being regulated by a large sliding door in front of the fire. The draught caused by the accumulation of so large a body of warm air in the chamber below the hair was so great as to cause the hops to dance on the hair and carry off the reek at once, and dried the hops, he (Mr. W.) believed, in the most economical manner. Another plan recently patented by Mr. Knight, by which the reek, even in all constructed oasts, was carried off without difficulty, was to pass a pipe of about six or eight inches bore through a cockle fire, up through the hair, a foot above the layer of hops. The atmospheric air rushed in at the bottom of this tube, was heated in its passage, and rushed in a rapid stream into the oast above the hops, where, being dry, it rapidly absorbed and carried off the reek. He had seen it applied in some first-rate oasts, which had been erected by Mr. George Russell, at Wilmington, where three loads of hops were excellently dried in less than twenty-four hours. In reference to the necessity of large stowage room, he had, not long since, had an opportunity of inspecting the new oasts of Lord Torrington, which had very little stowage room, and had been so constructed, on the opinion which he believed was now rapidly gaining ground amongst the factors, that the hops could not be packed much too soon.

The CHAIRMAN said that the flues went twice round the walls of his square kilns, and every portion of the internal surface was equally heated, excepting, perhaps, the portion immediately beneath the coal.

In reference to the question of treading or packing, Mr. Buckland, the hon. sec., said that Mr. Neve, of Benenden, had used a packing machine for about three years. A society existed in Benenden for rewarding the best treader of hops; and Mr. Neve's machine-packed sample had gained the prize, which he had of course not taken, although he had himself given the amount to his workpeople.

In a conversation which followed about sifting hops, the chairman said that his uncle had paid about double the usual price to have his hops picked one by one; but he had got £3 per cwt. more in consequence, having sold his Sussex hops last year for nine guineas.

After some further conversation, the following report was unanimously adopted:—

"That it is highly important to have the hops picked as free from leaves as possible, that when put on the kilns they should be dried by a gradual heat, be sifted almost immediately, and packed as soon as they are sufficiently cooled."

The secretary then read his report.

—Maidstone Gazette.

LOUGHBOROUGH AGRICULTURAL ASSOCIATION.

At the June quarterly meeting of members of the above Association, for the discussion of subjects connected with the welfare of agriculture, a subject on the rearing of cattle was introduced. S. B. Wild, Esq., of Costock, Nottinghamshire (one of the Vice-presidents), was Chairman, supported by a numerous assemblage of members, and of other friends of agriculture. After the usual loyal toasts, and a deservedly high eulogium on the constant attention of the president of the society, C. W. Packe, Esq., M.P., to its interests, the following paper was read by Mr. C. W. Wood, of Woodhouse—

ON THE REARING OF CATTLE.

Everything which relates to the management of stock is necessarily of great interest to the practical agriculturist; if, therefore, the remarks which I am about to offer to you, at the request of the society, should be found worthy of your consideration, and tend even in a small degree to improve the present method of "rearing stock," my labour will be abundantly rewarded.

It will be my object to confine myself strictly to the subject, avoiding the breeding department on the one hand, and the fattening on the other. I propose, in the first place, to consider "the constitution and economy of agricultural cattle;" secondly, "the state and condition in which they exist;" and thirdly, "their food and general management." In doing this, I crave your patient indulgence so repeatedly shown to me, and that you will judge with your usual generosity and kindness an attempt to lay before you my remarks, which I hope will be found both practical and useful.

The first proposition leads us to consider the substances which compose the animal frame, and their proper dispositions. We shall find here, if I mistake not, a key which will unfold many secrets in the general management of young cattle, particularly as regards their habits and their food. Science points out to us a framework of bones (the principal ingredients of which are phosphorus, lime, &c.), to give form, uprightness, stability, and strength to the machine; next an attachment of muscle (composed chiefly of fibrin or gluten), to give motion and activity to the body; and lastly, a respiratory and circulating apparatus, to supply heat, nourishment, and life to the whole, in order to resist the force of the chemical powers from without. Seeing, therefore, that we have a mixed machine to deal with, it is self-evident that mixed or combined means are needed, to carry out the first intentions of nature, and without which life could not exist. We must have, first, starch or sugar, to supply carbon for respiration; second, fat or oil, to keep up the fat which exists more or less in the bodies of all animals; third, gluten, or fibrin, to supply muscle and cartilage; fourth, earthy phosphates, for the supply of bones; and fifth, saline substances, sulphates and chlorides, to replace what is daily rejected in the excretions.

The second proposition requires to be clearly defined, viz., the state or condition of animals. We find this to be threefold, each of which requires our anxious attention. We have, first, a fœtal state, or one in connection with the mother, which exists before birth; secondly, a state of growth or development, which comprehends the period of birth to maturity; and thirdly, the state of the full-grown animal.

We have no control over the condition of the fœtal animal, except through the medium of the mother, the general management of which I shall speak of presently. Of the second condition, nature must be closely observed, and carefully imitated, in order that the third or ultimate condition may be healthy, full-grown, and useful—the great object of the farmer, to repay him for all his expense, anxiety, and toil.

It is a very false economy to stint the allowance of food to a young animal. New milk, or the flower of all leguminous plants, such as beans, peas, lintels, &c., which contain casein, and an infusion of oil-cake to promote fat, seems nearly to approximate to the composition of ordinary milk, skimmed milk being destitute of the principal ingredient required by nature for the support of respiration. This, in addition to warmth and cleanliness, will always keep the vital powers predominant over the chemical—the cardinal point in the rearing of cattle.

I now come to my third proposition, viz., "their food and general management"—and a more important and profitable subject cannot engage your attention. It must be considered in detail. I will begin, therefore, as I proposed, with the fœtal condition of the animal, and take a calf as a general example. It, like all other animals, is supported and nourished by the blood circulating from the mother through its own body, from the moment of its earliest formation up to the time of its birth—which blood contains, ready formed, all the various substances which are necessary for its formation. In addition, therefore, to all that is necessary for its own sustenance and existence, the cow forms a new and complete animal, it also secretes food for this new animal; which is to sustain and increase it for a considerable time after its birth; for the milk, like the blood, is the most perfect food, and contains every substance of which the body is built. When sucking is at an end, should we not imitate nature, a sure and unerring guide to philosophic truth? Any animal—whether cow, horse, sheep, or pig—having its own existence to support (I will add, in agricultural language, "in good condition"), a new animal to form, and one also to feed, is to say the least of it, in a most important and interesting condition. Is such an animal to be sent to feed upon a scanty pasture, to be turned into a wet and miserable farm-yard, or kept upon straw, and an occasional turnip, until she is little better than a bag of bones; and then, forsooth, to expect a fine healthy offspring, with an abundance of milk for its sustenance? And if such brilliant expectations are not realized, the fault is to be laid upon the poor beast—"She is not a good milker;" or to the land,—"It will not do for rearing, or for dairy purposes;" in short, upon anything rather than upon their own stupid, ignorant, and thoughtless minds. Breeding stock, gentlemen, cannot be kept too well; they are, in truth, feeding stock to others, and ought to have the best a farm affords; the best pastures in the summer, with cabbage, and common turnips in the autumn; Swedes, sweet straw, oil cake, and hay in the winter; and in the spring, after calving, some mangel wurzel, steamed potatoes, and hay, until the grass time again.

To nourish the young animal in the womb of its mother, an additional quantity of food must be given, and this quantity must be increased as the state of pregnancy advances; and the kind of additional food must readily supply the materials of the growing bones and muscles of the fœtus, and contain a larger quantity of starch or sugar also than the mother in her ordinary state would require. This is required by the circumstance that the mother must now breathe for herself and her young—the quantity of blood is increased, more oxygen is taken in by the lungs, and consequently more carbonic acid is given off. A certain proportion of bone and muscle also must be supplied to the young animal by the food given to the mother, or the bones and muscles of the mother herself will be laid under contribution to supply it; this must be effected by the quantity of phosphates, gluten, fibrin, or casein, which are given in the food with which the mother is fed.

An animal thus kept, will be in the most profitable condition to rear its young; and bear in mind, that as the calf grows rapidly, the food it requires increases daily with its bulk, and the demands upon the mother every day become greater. At this period, therefore, the cow must obtain larger supplies of food to sustain herself, and to produce a sufficient quantity of milk for her calf. If, then, adequate supplies are not given, a portion is daily taken from her own substance, which causes her to be lean and feeble, and her young stinted and puny in its growth.

What has been said regarding the food given to the cow, will be more or less effective in promoting the growth of the young animal fed solely on milk; when richer in curd, it will promote more muscle; when richer in phosphates, more bone; and in butter, more fat. Milk is a perfect food for a growing animal; nothing is wanted in it; the mother selects all the ingredients of this perfect food from the substances which are mingled in her stomach from the food she eats; she changes them chemically in such a degree as to present them to the young animal in a state in which it can most easily and with least labour employ them for sustaining its body, and all this at a given and appointed moment of time. In due time, the young animal begins to feed for itself; and then the mother improves in condition. Warmth, exercise, and good food are all that is then required, always bearing in mind that, as nature prepares the food for young animals in a state in which they can most easily digest it, so we should prepare by boiling or steaming all dry food and roots for the same purpose. In the growing animal the food has a double function to perform—it must sustain and it must increase the body; hence, whatever tends to decrease the sustaining quantity (and cold, exercise, and uneasiness do so) will tend in an equal degree to lessen the value of a given weight of food in adding to the weight of the animal's body. To the pregnant and to the milking cow the same remarks apply. The custom of allowing young cattle to remain during the whole winter in straw-yards, exposed to all the variations of weather, cannot be too loudly condemned; oil-cake, it is true, which is sometimes given in large quantities, makes some small amends by the supply of carbon to the system; but if a warm, dry, and clean shed was substituted, with turnips instead of cake, the condition and quality of the animal would be very much improved, and a considerable saving of expense be effected, to say nothing of the improvement in the manure.

All vegetables contain, ready formed (which they extract from the food on which they live), the substances of which the parts of animals are composed. The animal consequently draws, ready formed, the materials of its own body from the vegetable food it eats. The starch, sugar, and gum in vegetables are to supply carbon for respiration. Carnivorous animals obtain it from the fat of the food; starving animals from the fat of their own bodies; and young animals, which live upon milk, by the milk sugar it contains. In the young animal we find an excess of life; it has to increase as well as sustain itself. In the full-grown animal we find the daily waste of substance which is carried out of the body in the excretions made up by the gluten, phosphates, and the saline substances in its food, and a balance kept up between the powers of life and the bodily structure it simply has to sustain itself. In the old animal, when life is diminished, we observe a proportionate decrease of bodily substance.

It is interesting and wonderful, when we thus trace the existence of the bodily structure of all animals ready formed in the vegetable—which property in vegetables is formed during their growth—is derived from sources purely gaseous and inorganic, by chemical, mechanical, and physical operations. It is the duty of the practical farmer to adopt these methods for improving the soil; but this forms no part of my subject.

SHEEP.

The additional value to your flock, by this mode of management, and especially in giving them some dry food, such as hay or corn, before lambing, is very great. It gives firmness of fibre, and adds greater vigour to life, a greater activity to the vital powers, by which alone it is capable of resisting disease, and of arriving at an early maturity. The improvement of the fleece, by such a course, will be fifty per cent. The old breed were kept from two years to two years and a half old before sold, and rarely exceeded 10 or 15lbs. a quarter. It is true, breed has much to do with this question; but in sheep of the same breed, kept in different ways, a difference of 25 per cent. may be frequently observed. To ensure a healthy offspring, a good fleece of wool, and of sound staple, sheep require to be kept well, in the spring months particularly.

PIGS.

Pigs ought never to lose the fat or condition they receive from the mother, which is easily kept up by milk, peas, or beans, and all of which contain flesh. A small quantity of oil-cake, once or twice a-day, in addition to turnips, mangel-wurzel, or any vegetable food; fed in this way, many months are saved in time, and you have the advantage of summer feeding, which, on account of the warmth, is by far the best period of the year for this purpose.

HORSES.

I need only say that where great muscular developement is required, as in the case of race-horses which run for the two-year-old stakes, they are corned very high as soon as they can eat it; and it is astonishing to see the strength and activity resulting from such a plan. Early maturity is very profitable here. Give your yearlings plenty of oats and beans, with steamed potatoes during the winter, and you gain a complete year in time, besides the increased value you put upon the animal: and in the summer feed them upon rye, dills, or clover, the best possible food for horses. The sooner they are broken, the better; their tempers become quieter, and they thrive more. I wish to mention here the great value of salt to all young animals; it destroys bots and worms, it promotes digestion, and assists the secretion of healthy bile, the medium through which respiration is supported; this, however, should be given in moderate quantities.

Having now spoken upon the general management of the various kinds of cattle usually reared by the farmer, I shall conclude with a few remarks upon their food; and I deem you will not consider this out of place. The amount of food either for man or beast which a given acre will produce depends considerably upon the kind of crops which is raised. Thus, a crop of thirty bushels of wheat will yield only about 1,400lbs. of fine flour, while a crop of six tons of potatoes will give about 4,400 lbs. of an agreeable, dry, and meally food.

It is said, on the authority of the Board of Agriculture, that a crop of clover, tares, rape, or potatoes, cabbage, or turnips, will furnish at least three times as much food for cattle as of pasture-grass of medium quality. This, however, being but a hint, I will at once give you a table of the nutritive qualities of the various sorts of food now in common use. It is selected with some care from the various tables published, and has direct reference to the subject before us, on account of the proportions of gluten, starch, and oil which each article contains.

In the root crops I place first carrots; second, mangel-wurzel; third, Swedes; fourth, potatoes; fifth, cabbage; sixth, common turnips.

In the green crops—first, dills; second, rye; third, clover; and fourth, grass.

In the corn crops—first beans; second, peas; third, lintels; fourth, wheat; fifth, barley and Indian corn; sixth, oats; seventh, rye; eighth, buckwheat.

In the straw crops—first, pea-straw, which is nearly equal to hay; second, oat and barley-straw; fourth, wheat-straw; fifth, rye-straw; and sixth, bean-straw.

Three pounds of oil-cake are equal to about ten pounds of hay.

Having now executed my task, it only remains for me to thank you for your kind attention. If this effort should form the means of confirming some, of teaching others, and of exciting a lively and profitable interest in all, my object will be more than gained. I earnestly hope that science will go hand in hand with practical agriculture, spurred on by capital and industry. Her sons will ever hold a most conspicuous station amongst men, and their efforts make the landed interest what it ought to be—at once the foundation of the wealth and comfort of the nation.

At the close of the meeting, the following resolution was unanimously agreed to:—

"That in the rearing of cattle it is expedient, for the healthy development of early life, that a food should be supplied as nearly in accordance with the provision of nature as the discoveries of science have made known, in other material than that of the mother's milk, where this is denied."

ON DRESSING GRASS LAND.

The following remarks may, perhaps, be useful both to those who are inclined to try the effects of artificial manures, especially guano, and to those who have done so. I have under my charge a hundred acres of grass land, in very poor condition; and as my employer is likely to be in possession of it for several years, of course the sooner it can be improved the longer time he will have to reap the benefit. Farm-yard manure cannot be got here without costing twice its value for carriage; and therefore I thought something less expensive and easier to be got at, would better suit my purpose. Some of my friends recommended a dressing of marl, there being plenty on the estate; others soot; others salt, &c.: but I was rather doubtful of the efficacy of some of these. I thought it advisable to try a small quantity of each as an experiment for the first year, and I selected a piece of ground as nearly as possible equal in quality, which I divided into quarters of acres. To have the pieces as near each other as possible, I lined them off at half a chain in width, which increased them in length, giving each the chance of greater variety of soil should there be any. The following table shows the different manures, the quantity applied, the time when applied, the cost, including preparation and the labour of applying them, the weight of produce compared with that where no dressing was put on, at the time of putting into the stack, calculating the value at £4 per ton. The produce was cut on the 7th of July:—

Without Dressing.

	T.	cwt.	qr.	lb.		£	s.	d.
Produce	0	12	2	12	Cost	0	0	0

Guano, 9 cwt. per acre, applied March 24th.

	T.	cwt.	qr.	lb.		£	s.	d.
Produce	1	16	2	4	Value of extra produce..	4	15	7½
Deduct	0	12	2	12	Deduct cost of guano ..	4	1	8
Leaves gain of....	1	3	3	20	Total profit..	£0	13	11½

Guano, 5 cwt. per acre, applied March 24th.

	T.	cwt.	qr.	lb.		£	s.	d.
Produce	1	6	0	0	Value of extra produce..	2	13	6
Deduct	0	12	2	12	Cost of guano	2	5	5
Leaves gain of....	0	13	1	6	Total profit..	£0	8	1

Guano, 3 cwt. per acre, applied March 24th.

	T.	cwt.	qr.	lb.		£	s.	d.
Produce	0	16	0	20	Cost of guano	1	7	3
Deduct	0	12	2	12	Value of extra produce..	0	14	3
Leaves gain of....	0	3	2	8	Total loss..	£0	13	0

Soot, 20 bushels per acre, applied March 29th.

	T.	cwt.	qr.	lb.		£	s.	d.
Produce	0	15	2	0	Cost of soot	0	14	4
Deduct	0	12	2	12	Value of extra produce..	0	11	6
Leaves gain of....	0	2	3	16	Total loss..	£0	2	10

Coal-ashes, 224 bushels per acre, applied April 10th.

	T.	cwt.	qr.	lb.		£	s.	d.
Produce	0	12	2	20	Cost of ashes..........	1	6	8
Deduct	0	12	2	12	Value of extra produce..	0	0	3
Leaves gain of....	0	0	0	8	Total loss..	£1	6	5

Lime, 12 quarters per acre, applied April 10th.

	T.	cwt.	qr.	lb.		£	s.	d.
Produce	0	11	3	20	Cost of lime	2	14	8
A decrease of......	0	0	2	20	Value of decrease	0	2	7½
					Total loss..	£2	17	3½

Marl, 24 tons per acre, applied April 10th.

	T.	cwt.	qr.	lb.		£	s.	d.
Produce	0	9	1	8	Cost of marl	2	9	10
A decrease of......	0	3	1	4	Value of decrease......	0	13	1½
					Total loss..	£3	2	11½

Salt, 2 bushels per acre, applied March 23rd.

	T.	cwt.	qr.	lb.		£	s.	d.
Produce	0	7	1	16	Cost of salt	0	4	4
A decrease of......	0	5	0	24	Value of decrease......	1	0	9
					Total loss..	£1	5	1

The following table will show the advantage the 9 cwt. of guano has over the 5 cwt. and the 3 cwt. per acre.

	T.	cwt.	qr.	lb.		£	s.	d.
The extra produce of 9 cwt.......	1	3	3	20				
Ditto 5 cwt.......	0	13	1	16				
Balance of 9 over the 5 cwt.	0	10	2	4	Value ..	£2	2	1½
	T.	cwt.	qr.	lb.				
The extra produce of 5 cwt.......	0	13	1	16				
Ditto 3 cwt.......	0	3	2	8				
Balance of 5 cwt. over 3 cwt.	0	11	3	8	Value ..	£2	7	3
	T.	cwt.	qr.	lb.				
Here 9 has the balance over 5 of ..	1	0	1	12	Value ..	£4	9	4½

It is thus proved, by the above, that only two out of the eight dressings will meet their expense, that of the nine and the five cwt. of guano to the acre; and this also shows that a little will not do. People are very liable to err by trying small quantities: they say, we will try one cwt. to the acre, and, if we profit by that, we will try more next year; but when they compare the produce with the expense, they find they are great losers, and the manure is condemned. Manure is to the soil what medicine is to the human frame. For instance, we may have an inward complaint, and take one pill to cure it; to-morrow, being no better, we take another; next day the same, and so on, perhaps, for twelve months; but if one dose does no good, and we take three, we get relief almost immediately, and the cure is certain: this is on account of the more powerful stimulus: had we taken it in time, one pill might have proved effectual; but we neglected it till it got too deep a hold, and beyond the power of one, and therefore it required three. It is exactly the same with this poor land; it has got beyond the power of three cwt. of guano, and consequently we must give it nine cwt. of guano before the desired effect is produced. Again, we have medicines which are quick to operate, and *vice versa;* it is the same with manures, therefore. I cannot condemn those that have not yielded me profit this year. I shall see what next year does; perhaps they may yield double crops, and for years to come, when the more stimulant sorts are exhausted. I have at times applied lime, with the greatest success, especially on stiff cold land. (This, on which the experiment was made, I may mention, is of a gravelly flinty nature, with a chalk bottom.) Part of the failure in the lime I attribute to its being put on late; but still it was on before the grass had made any growth. I may also state, that where the guano was applied, the hay was of very superior quality, and fit for cutting three weeks before the others, which would have insured a good second crop by this time, as it is now in advance of the others. Next year I mean to try the manure water; but as the quantity will be limited, I must have other manures as well. Perhaps some of your correspondents will be kind enough, through the medium of your paper, to state what with them has proved the most beneficial, also the quantity applied, and the mode of applying it, &c.—J. Smith, —United Gardners' and Land-Stewards' Journal.

FAILURE OF THE TURNIP AND POTATO CROPS IN THE NORTH OF SCOTLAND, AND ITS EFFECTS ON THE CATTLE TRADE.

Aberdeen, Sept. 8, 1846.

There is now reason to fear that the turnip crop in the North of Scotland will, ere long, be destroyed. The same mysterious malady which proved fatal to the potato crops has seized the turnips; and unless dry bracing windy weather prevail during the present month, thousands of acres of this root will present an unsightly mass of putrefaction and decay. We have examined whole fields, in which but few are safe; others, where the crop seems healthy and most abundant, and, from inquiries made of practical farmers, we are led to conclude that thus the blight has extended to every district in the north.

An occurrence of this kind would have been of small consequence twenty years ago; but now that the cattle trade has become so important, the destruction of the principal article hitherto used for feeding cattle, especially for the London market, must be seriously felt. For example, from the port of Aberdeen during the last twelve years the following shipments of fat bullocks were made for the London market:—

	Cattle.
1834	2,405
1835	3,125
1836	8,048
1837	7,001
1838	5,843
1839	7,445
1840	6,422
1841	6,608
1842	9,543
1843	8,622
1844	10,591
1845	11,928
1846	12,300
	99,891

or in round numbers say about a hundred thousand cattle, weighing nearly fifty thousand tons. When to this we add the shipments from the ports of Peterhead, Fraserburgh, Banff, and Inverness, we shall have an aggregate of nearly a quarter of a million of prime animals exported from the north of Scotland to London in twelve years. It is worthy of remark, too, that although the opening of our ports for the importation of foreign cattle had the effect of slightly diminishing the exports from Aberdeen, the returns for the last three years show an extraordinary increase, and we believe that the cattle-dealers generally admit that the prices during that period have been of the most remunerating kind.

Now, in view of these facts, the failure of the turnip crop must appear a great calamity. The first and most palpable loss is the value of the seed, the labour, and the rent of the land. One farmer and cattle-feeder we conversed with on the subject stated that he estimated the value of his turnips (300 acres) a month ago at 2,000*l.*; a month hence he does not expect they will realize 500*l.* The same farmer had 60 acres of potatoes that he could have sold for from 400*l.* to 500*l.*, now they are not worth 50*l.* Many others are placed in exactly similar circumstances.

But while it is distressing to hear of these losses, and to calculate their immediate results, it is gratifying to know that there are substitutes for the turnip as well as the potato. The reduction of the duty on oil cake and other foreign vegetables will yet enable our cattle-breeders to feed their bullocks on terms that will not materially raise the prices of meat. Oil-cake has rather advanced in the market, the prospective demand being greater than the probable supply; but the introduction of the "Portuguese Carob bean pods" will do more than make up for any deficiency that can possibly occur. This bean has been proved by experience here to be very beneficial and economical in feeding and fattening horses and cattle. From an analysis, by Professor Johnston, of the Highland Society's Agricultural Chemistry Association, it appears that the bean contains—

Sugar (impure)	46.76
Gum, and a little colouring matter	4.46
Gluten	2.05
Fat	0.34
Woody fibre, with an undetermined quantity of coagulated albumen	23.78
Water	22.38
	99.77

Thus, then, thanks to free-trade, we have nothing to fear from native blights or mildews, the dispositions of Providence being so bountiful that what one nation lacks another can supply. And these very dispensations, of which complaint is now made, will in the end be overruled for good. They will encourage men everywhere to make nature speak the language of nature, and not force her to yield an abundance of that she was never intended to supply. Moreover, they will practically teach nations mutually to depend on each other, and cannot fail to superinduce that friendly intercourse and relationship amongst all which must ultimately tend to promote the general good.—Morning Chronicle.

SALE OF SHORT-HORNS AT WISETON.

Sale of the Short-horned Cattle bred by the late Earl Spencer, and bequeathed by his lordship to Mr. John Hall, sold by auction by Mr. Wetherell, on the 11th of September, at Wiseton :

COWS AND HEIFERS.

		GS.
1	Violet, roan, calved 1836, by Wiseton, to the Hon. H. Wilson, for	20
2	Bargain, roan, 1837, by Firby, not put up	
3	Sackbut, roan, 1836, by William, Mr. Rathberry	27
4	Zeal, white, 1837, by Roman, Mr. Rathberry	40
5	Ornament, roan, 1838, by Roman, Mr. Torr	47
6	Music, white, 1837, by Roman, Lord Ducie	50
7	Duenna, roan, 1838, by Roman, Mr. Wedge	25
8	Fixture, roan, 1838, by Roman, Lord Ducie	110
9	Fairy, white, 1839, by Warlock, Mr. Crawshaw	25
10	Spinette, red, 1839, by William, Mr. Mann	35
11	Tunic, white, 1839, by Warlock, Mr. Everett	37
12	Temperance, roan, 1839, by Roman, Mr. Burnett	41
13	Julietta, roan, 1840, by Guardian, Mr. Wedge	26
14	Nectarine, roan, 1840, by Wiseton, Mr. Jordan	20
15	Erato, roan, 1840, by Guardian, not put up	
16	Lace, roan, 1840, by William, Mr. Jordan	48
17	Salvia, red and white, 1840, by Wiseton, Mr. Jordan	22
18	Hoiden, white, 1840, by Roman, Mr. Machin	43
19	Lactea, red, 1840, by Sweet William, Mr. Worsey	31
20	Bizarre, roan, 1840, by Sweet William, Hon. H. Wilson	25
21	Sarcenet, roan, 1840, by Roman, Earl of Mount Edgecumbe	27
22	Defence, roan, 1841, by Roman, Mr. Greatham	21
23	Lodoiska, roan, 1841, by Orontes, Mr. Smith	32
24	Onion, white, 1841, by Roman, Mr. Watson	25
25	Necklace, red and white, 1841, by Wiseton, Mr. Bucher	28
26	Illusion, roan, 1841, by Orontes, Mr. Champion	42
27	Regan, red, 1841, by Ranunculus, the King of France	92
28	Renown, roan, 1841, by Roman, Mr. Jordan	21
29	Hortensia, white, 1841, by Roman, Mr. Smith	33
30	Tambourine, white, 1841, by Wiseton, Mr. Gillott	26
31	Deception, roan, 1841, by Roman, Mr. Wedge	28
32	Banksia, roan, 1841, by Ranunculus, not put up	
33	Seraphina, roan, 1842, by Zenith, Mr. Parkinson	40
34	Clio, roan, 1842, by Orontes, Mr. Gillott	27
35	Daffodil, roan, 1842, by Sweet William, Mr. Lakin	31
36	Folly, roan, 1842, by Orontes, Mr. Greatham	32
37	Willow, roan, 1842, by Zenith, Mr. Jordan	22
38	Vanity, red and white, 1842, by Ranunculus, Lord Zetland	135
39	Malibran, red and white, 1842, by Ranunculus, not put up	
40	Dimity, white, 1842, by Zenith, Mr. Champion	35
41	Caprice, white, 1842, by Zenith, Mr. Machin	32
42	Trumpet, roan, 1842, by Sweet William, Mr. Baldwin	29
43	Etiquette, white, 1843, by Zenith, Mr. Colvin	30
44	Elegy, white, 1843, by Zenith, Mr. Wedge	23
45	Sleet, white, 1843, by Zenith, Mr. Burnett	40

		GS.
46	Web, roan, 1843, by Olympus, Mr. Gillott	23
47	Florentia, white, 1843, by Zenith, Lord Ducie	36
48	Chess, roan, 1843, by Ranunculus, Mr. Machin	32
49	Nereide, roan, 1843, by Wiseton, Mr. Lakin	25
50	Cream, red and white, 1843, by Orontes, Lord Ducie	50
51	Rosalita, roan, 1843, by Wiseton, Mr. Goodwin	23
52	Vapour, roan, 1843, by Zenith—lame, and put up at a reserve bid of 100 guineas, but not sold	
53	Gossamer, red and white, 1843, by Wiseton, Mr. Gillott	23
54	Plum, roan, 1843, by Zenith, Mr. Maxwell (Ireland)	36
55	Aura, roan, 1843, by Zenith, Mr. Wedge	20
56	Trombone, roan, 1843, by Wiseton, Mr. Liston	29
57	Caloric, white, 1844, by Zenith, Mr. Colvin	27
58	Equity, roan, 1844, by Zenith, Lord Ducie	100
59	Flame, roan, 1844, by Zenith, the King of France	70
60	Andria, white, 1844, by Wizard, Mr. Malin	40
61	Glory, red, 1844, by Orontes, Mr. Robinson	71
62	Finesse, roan, 1844, by Wizard, Mr. Barnett	25
63	Intrigue, roan, 1844, by Orontes, Mr. Bucher	28
64	Dorcas, roan, 1844, by Zenith, Lord Kinnaird	38
65	Moonbeam, roan, 1844, by Evander, Lord Kinnaird	31
66	Olive Leaf, roan, 1844, by Orontes, Mr. Lakin	40
67	Euterpe, roan, 1844, by Evander, Mr. Burnett	48
68	Pearl, roan, 1844, by Zenith, Mr. Goodwin	17
69	Legacy, roan, 1844, by Wiseton, Sir R. Pigott	21
70	Petticoat, white, 1844, by Zenith, Mr. Knox	32
71	Ida, red and white, 1844, by Evander, Mr. Gillott	37
72	Remembrance, roan, 1844, by Wiseton, Mr. Goodwin	22
73	Jonquil, roan, 1845, by Wizard, Mr. Maxwell (Ireland)	27
73*a*	Barmaid, 1844, Mr. Lakin	20
74	Madrigal, roan, 1845, by Zenith, Mr. Robinson	62
75	Farce, roan, 1845, by Zenith, Lord Ducie	40
76	Yarrow, white, 1845, by Wizard, Mr. Lakin	16
77	Oceana, roan, 1845, by Lycurgus, Mr. Greetham	15
78	Urad, red, 1845, by Lycurgus, Mr. Torr	20
79	Esperance, white, 1845, by Wizard, Mr. Torr	37
80	Flora, white, 1845, by Wizard, Lord Ducie	30
81	Garland, roan, 1845, by Lycurgus, Lord Ducie	50
82	Naiad, roan, 1845, by Humber, Mr. Brown	25
83	Drum, white, 1845, by Humber, Mr. Machin	35
84	Repeal, roan, 1845, by Lycurgus, Mr. Atkin	26
85	Iniquity, roan, 1845, by Wizard, Mr. Isles	20
86	Penance, roan, 1845, by Lycurgus, Mr. Torr	25
87	Vestal, white, 1845, by Humber, Sir R. Pigott	32
88	Elegance, roan, 1845, by Lycurgus, Lord Ducie	51
89	Emma, red and white, 1845, by Humber, Mr. Strafford	22
90	Pomegranate, red, 1845, by Humber, Mr. Gillott	16
91	Graceful, red, 1845, by Lycurgus, Mr. Atkin	30
92	Sparta, red, 1845, by Lycurgus, Rev. W. Peel	18
93	Warp, roan, 1845, by Humber, Lord Ducie	50
94	Aurora, red, 1845, by Humber, Sir R. Pigott	28
95	Industry, roan, 1845, by Humber, Lord Milton	51
96	Buttermilk, white, 1845, by Zenith, dead	
97	Mirth, red, 1846, by Evander, Mr. Lakin	31
98	Heroine, roan, 1846, by Orontes, Lord Milton	33

		GS.
99	Curfew, roan, 1846, by Humber, Lord Milton	22
100	Puzzle, white, 1846, by The Lord Warden, Mr. Strafford	12
101	Extasy, white, 1846, by Zenith, Mr. Clark	25
102	Legerdemain, roan, 1846, by Evander, Mr. Barnett	12
103	Figurante, roan, 1846, by Zenith, Earl of Zetland	21
104	Mirza, red and white, 1846, by Evander, Mr. Lakin	20

BULLS.

		GS.
105	Zenith, white, 1840, by Sweet William, Mr. Greetham	30
106	Evander, roan, 1842, by Roman, Mr. Isles	36
107	Lycurgus, red, 1843, by Orontes, Mr. James Cross	50
108	Lamplighter, roan, 1845, by Wizard, Earl of Mount Edgecumbe	54
109	Delville, roan, 1845, by Lycurgus, Mr. Smith	41
110	Lawrence, roan, 1845, by Humber, Earl of Mount Edgecumbe	86
111	Exquisite, roan, 1845, by Humber, Messrs. Booth and Torr	370
112	Chorister, roan, 1845, by Humber, Mr. Atkins	43
113	Capsicum, red and white, 1845, by Humber, Mr. Jordan	31
114	Jew's Harp, roan, 1845, by Humber, Mr. Maxwell	36
115	Tinker, roan, 1845, by Evander, the King of France	225
116	Sir Roger de Coverley, red and white, 1846, by The Lord Warden, Sir G. Heathcote	50
117	Skim Milk, red and white, 1846, by the Lord Warden, the King of France	40
118	Dulcimer, roan, 1846, by Orontes, Lord Milton	95
119	Zoroaster, roan, 1846, by Lycurgus, the King of France	150
120	Stonecrop, roan, 1846, by Evander, Mr. Tomby	31
121	Necromancer, red, 1846, by Evander, the King of France	42
122	Father Mathew, white, 1846, by Evander, Mr. Sison	14
123	Paletot, red and white, 1846, by King Lear, dead	..

THE USE OF MAIZE OR INDIAN CORN.

The rapid rise which has taken place in the price of this kind of grain within the last few weeks, as well as the large orders for it which are every day arriving from Ireland, prove that it is about to become a great article of food in the three kingdoms, and especially in Ireland. Until the recent sudden increase of demand, maize formed a much cheaper food, taking weight and quality into the account, than that yielded by any other kind of grain; and it is still cheaper than any other, notwithstanding the recent advance in price. If we are correctly informed, maize is seldom stripped from the husk before the month of November, in the United States, or before the spring, in the Black Sea, owing to the difficulty of separating it until it is perfectly dry; so that the quantity to be sent forward from either of those quarters cannot, for some time, be such as to reduce prices. The quantity, however, grown in the United States alone is not less than fifty millions of quarters a year; and as it is also grown in considerable quantities on the Lower Danube and on the shores of the Mediterranean, there can be no doubt that the recent rise in prices will cause large shipments to be made as soon as possible, and thus, before long, establish such a range of prices as will secure the population of England and Ireland all the advantages of this new and valuable description of food. Mixed with wheaten flour, in the proportion of one part to two, it makes excellent bread; and it is highly relished by children and adults in almost every form in which it can be prepared.

The following table of the quantity of wheat and of maize grown in each of the States of America, in the year 1845, shows how extensively the latter is cultivated in all the warmer districts of the United States. It is there used, not only as human food, but for feeding cattle and horses, as oats, beans, potatoes, turnips, and hay are used in this country:—

	Wheat. Bushels.	Indian Corn. Bushels.
Ohio	13,572,000	57,600,000
Pennsylvania	12,580,000	17,126,000
Indiana	7,044,000	30,625,000
Illinois	4,563,000	25,584,000
New York	16,200,000	13,250,000
Virginia	11,885,000	27,272,000
Tennessee	8,340,000	70,625,000
Kentucky	4,769,000	54,625,000
Michigan	7,061,000	4,945,000
Maryland	4,884,000	3,273,000
North Carolina	1,969,000	14,887,000
South Carolina	1,168,000	8,184,000
Maine	502,000	1,912,000
New Hampshire	647,000	1,828,000
Massachusetts	241,000	3,098,000
Rhode Island	5,000	731,000
Connecticut	114,000	2,649,000
Vermont	854,000	1,728,000
New Jersey	1,050,000	7,314,000
Delaware	440,000	516,000
Georgia	1,571,000	2,713,000
Alabama	980,000	16,650,000
Mississippi	378,000	2,167,000
Missouri	1,525,000	15,625,000
Arkansas	2,427,000	8,250,000
Florida	—	733,000
Wisconsin	971,000	672,000
Iowa	793,000	2,028,000
District of Columbia	15,000	35,000
	106,548,000	417,899,000
	Qrs. 13,318,500	Qrs. 52,237,375

Owing to the rapid increase of the demand for Indian corn, 40s. a quarter was yesterday refused in Liverpool for corn which was sold a few weeks since for 25s.—Liverpool Times.

METEOROLOGICAL DIARY.

Barometer.			Thermometer.			Wind and State.		Atmosphere.		
Day.	8 a.m.	10p.m.	Min.	Max.	10p.m.	Direction.	Force.	8 a. m.	2 p. m.	10 p. m.
	in. cts.	in. cts.								
Aug. 21	29.77	30.00	57	70	57	N. by East	gentle	cloudy	sun	fine
22	30.00	30.10	52	64	54	N. by East	gentle	cloudy	cloudy	fine
23	30.10	30.16	52	71	59	N. by East	gentle	fine	fine	fine
24	30.18	30.24	57	67	57	N. by East	gentle	cloudy	cloudy	cloudy
25	30.24	30.24	47	67	57	N. by East	brisk	fine	sun	fine
26	30.20	30.10	50	67	57	N. East	brisk	fine	sun	fine
27	30.06	30.00	55	73	59	N. East	lively	fine	sun	fine
28	30.00	29.99	57	75	60	N. East	brisk	fine	sun	fine
29	29.99	30.06	58	73	58	N. East	brisk	fine	sun	fine
30	30.12	30.20	51	71	55	North	brisk	cloudy	sun	fine
31	30.20	30.21	49	77	60	W.byN.N.W.	brisk	haze	sun	cloudy
Sept. 1	30.29	30.30	55	67	53	N. by East	lively	cloudy	sun	fine
2	30.32	30.32	48	70	54	North	lively	fine	sun	fine
3	30.32	30.29	45	70	55	North	gentle	fine	sun	fine
4	30.29	30.25	46	70	56	N. E., S. E.	gentle	fine	sun	fine
5	30.21	30.11	56	74	61	N. East	lively	fine	sun	fine
6	30.05	29.97	59	81	60	N. East	gentle	cloudy	sun	fine
7	29.97	29.94	54	78	58	Var., East	lively	fog	sun	fine
8	29.95	30.02	57	73	57	N. East	lively	fine	sun	fine
9	30.05	30.16	57	75	58	N. West	lively	cloudy	sun	cloudy
10	30.30	30.36	56	70	59	N. East	lively	cloudy	cloudy	fine
11	30.39	30.40	58	72	60	N. East	gentle	cloudy	sun	fine
12	30.40	30.41	53	73	61	N. East	brisk	cloudy	sun	fine
13	30.41	30.35	51	67	53	N. East	lively	fine	sun	fine
14	30.33	30.27	51	67	50	N. East	gentle	fine	sun	fine
15	30.28	30.20	48	72	53	N. by West	gentle	fine	sun	fine
16	30.27	30.04	49	73	57	Westerly	gentle	fine	sun	fine
17	30.13	30.00	46	76	58	W. S. E.	gentle	fine	sun	fine
18	30.00	30.00	52	66	52	S. E., N. E.	gentle	cloudy	fine	fine

ESTIMATED AVERAGES FOR SEPTEMBER.

Barometer.		Thermometer.		
High.	Low.	Low.	High.	Mean.
30.410	29.410	36	76	57.8

REAL AVERAGE TEMPERATURE OF THE PERIOD.

Lowest.	Highest.	Mean.
52.6	71.34	61.97

WEATHER AND PHENOMENA.

August 21, Becomes more settled, and the barometer rises fast. 22, Still cloudy before evening. 23, Quite fine. 24, Overcast, but drying. 25, Lively air; bright sun. 26, The same. To this day the air and temperature have been exquisite. 27, Heat increases. 28, Curious modification of clouds; indication of change; increase of heat; powerful sun. 29, A slight shower, and faint rainbow. 30, Very fine. 31, Misty; followed by great heat till evening, then a change.

LUNATIONS.—New moon, 21st day, 11 h. 25 m. afternoon; first quarter, 29th, 10 h. 19 m. afternoon.

September 1, Beautiful day; refreshing temperature. 2, Nights become cooler. 3, 4, 5, Same brilliant, cheerful weather. 6, Again oppressive; electric cross currents. 7, Heavy thunderstorm, and the only brisk *rain* of the period; but for scarcely one hour. 8, North-east current, and settled weather. 9, A hint of rain, with wavering of the wind. 10, Generally cloudy; pleasant evening. 11, 12, Cloudy early, clearing off. 13, 14, 15, Extremely fine; atmosphere splendidly clear. 16, Mercury falls, and wind becomes westerly. 17, Very close and warm. 18, Wind again brisk from east; clouds in masses early, with a few minutes' rain.

LUNATIONS.—Full moon, 5th day, 1 h. 16 m. afternoon; last quarter, 12th, 11 h. 42 m. morning.

REMARKS REFERRING TO AGRICULTURE.

It is only necessary to look at the above table to certify the fact that the harvest must have been entirely secured; nothing remains but a few hops, and these are being rapidly picked. Of their appearance and quality different opinions must be formed, since one field or garden differs from another amazingly in height and strength of plant. Passing through many miles of Kent, these variations become manifest; some plantations being three times as strong in every respect as others. On the whole, it should seem that the plant has wanted a far more liberal supply of rain; yet report speaks well of the general quality. The land suffers as to verdure—it is parched and dry; and rain is wanted to enable the ploughman to do his work. The prognostic of the *oak* and *ash* trees, alluded to in the spring, has been so marked by a summer of solsticial heat (even now 4° above the September average) that it merits most rigid investigation. JOHN TOWERS.

Maidenhead Thicket.

CALENDAR OF HORTICULTURE.—OCTOBER.

THE WEATHER.

A thunder-storm of some magnitude and extent visited the country on the 6th and 7th of September. We call it a storm because it seems to have commenced by lightning on the 6th, at night, after a most sultry day, in places west of the metropolis; whereas the storm fell in fury on the 6th to the east and south, visiting Bucks and Berkshire in the afternoon of the 7th. Rain and hail are mentioned; but in the last-named county the rain, without hail, was very moderate: yet it was all that fell during the first half of September.

Such a season of splendour and of solar heat our tables do not record; and we venture to suggest that if the average of sixteen days, late as it is, was fairly taken, it would be found to comprise more of real summer heat than occurred in the whole of the year 1845. The ground is again actually parched—a condition that has existed, with few alterations, since the last week of May: hence the meagreness of the potato crop. It may be asserted that prior to the end of June a very large proportion of the middle-season potato crop was ripe, and then beginning to send out a secondary crop of small tubers, to the great deterioration of the final yield. Thus we have not only a small, defective return, owing to heat and drought, but also more or less of taint in all the plots.

Fungus certainly attaches itself to every bad leaf or leaflet, but as a consequence, and not as the *cause*. Yet, in despite of the malady, and whether the haulm have been left, cut off, or pulled up, we find nine-tenths of the potatoes good and sound. Never was the table better supplied: yet in wet, clay lands, there is reason to fear that the return is very much worse. As to remedy, we know of none. Nature will work a cure in due season; but while doubt remains, it will be advisable to try an immediate planting, five inches deep, with a ridge of earth over that, so as to protect the plant from frost and to throw off the rains of winter. Something may be gained in point of time; and as the disease has commenced during the first week of each August, the tubers may be so far advanced next year as to produce a better and earlier return: at least, these are motives which are staunchly advocated by some writers.

One circumstance is worthy of notice: the half of a field near Cookham, Berks, was cropped very late in spring—perhaps in June; *every plant is green*, and *in the vigour of foliage* (17th Sept.) It is highly probable that, in consequence of protracted dry weather, there will be a very small and feeble crop; but there does not seem to be a diseased leaf in the whole breadth. This is the only instance of freedom from taint which has been seen in a journey of 100 miles.

VEGETABLE GARDEN.

The main object is thoroughly to clean the plots and spaces, so as not to leave a weed; to earth up the stems of broccoli and of the celery plants in trenches: and then to dig, double-dig, or trench with ridges all ground not to be occupied during winter. Plots intended for peas should be dressed with good decayed dung, and, after deep digging, left in drills and ridges made at regular distances to mellow against the turn of the year. As to sowing peas, it is a sort of forlorn attempt, since the seeds, if put into boxes, or into strips of grass turf inverted, and excited by gentle heat in January, will be more safe and equally forward.

Broad Beans.—The Mazagan and long-pod may do well, if sown by the 25th, in a bed of light earth, about an inch and a half asunder, either by drawing off two or three inches of the surface-earth to one side and returning it over the seed, or by striking drills to an equal depth. When the plants are up, they can be readily protected by a frame, or by a spare light or two, and a mat over the glass.

Transplant *lettuces*, either upon ridges of light rich earth, or into a frame: the ridge preserves the roots dry, the frame protects from frost. The work should be done in the first week.

Endive.—Bleach it by tying up the best plants compactly, from the top to near the middle, with strands of bass-matting; then invert over each a sea-kale, or other deep pot. Some persons are content to lay a flat tile upon the face of the endive; but the weight crushes the leaves. A better and less rude method would be to bend back the lowermost spreading leaves over the hearts; to hold them compactly, and turn over a deep round pan, pressing its edge into the earth; and finally, to cover with a shovel of sand or dry earth.

Plant out *cabbages* from the August seed-beds, and *coleworts* of July sowing. Choose an open exposure, and incorporate some rotten manure; but above all, if possible, select new earth for all this family: therefore, dig out the first deep spit, raise the second and put it aside, turn in the next top spit, and let the lower spit occupy the top. If this be a good loam, the strength and verdure of the plants will soon show how much they prefer new soil to any that has been long under crop. Retain most of the seedlings in the nursery bed during winter, to furnish successions or to replace lost plants; they can easily be protected if severe weather occur.

Cauliflowers.—Transplant at the end of the month some good plants into ground prepared as for cabbages, but with a liberal supply of dung. Four to six plants may be covered by one hand-glass. A long row, three or four feet in front of a fruit wall, answers well. Hoe thoroughly, in the dryest weather, between late broccoli and all the rows of the cabbage tribe, drawing some earth to the stems.

Winter spinach is very fine this year, and in fresh earth has already produced abundance. The rows ought to be Dutch-hoed; and in picking, not only should the largest leaves be taken singly, but many plants ought to be drawn in thinning, in order to leave the rest three or four inches apart.

Asparagus will require final regulation by the end of this month. Save some of the best seed, if required; then cut the plants down low. Remove the haulm, sweep the surface, then hoe it, and rake the ground. This plant requires no top-dressing, or care during winter; it is quite hardy. Of the spring regulation we refrain from saying anything till due season: it is of material consequence.

Treat *sea-kale* much in the same manner.

Commence forcing asparagus in frames or brick pits, by means of deep beds of tree-leaves; also sea-kale, by linings around the blanching pots.

Sow successional quantities of *mustard, cress,* and *radish;* they, as well as small *cabbage-lettuce,* will be more secure if sown in frames.

FRUIT DEPARTMENT.

Apples and *Pears.*—Dwarfs, Espalier and Wall-trees.—Now cut back to well-seated spurs all the wood of summer that had been curtailed for the purpose; then lay in straight the reserved wood of the trained trees.

Gather fruit for store tenderly, and not in the random manner too often practised. Common store apples are kept by the orchardists in great heaps, covered with several inches of dry wheat-straw. The stock of this fruit is very low this year, in consequence of the early bloom being checked by the sudden frost of March 18th and 19th. The better sorts, as the Ribstone and Nonpareil, should be laid on shelves in some cool and dark room.

Peach and *nectarine-trees* have a better appearance if pruned and trained for the winter; yet we are told to un-nail, and suffer the branches to enjoy free play and access of air! How are we to reconcile such inconsistency? We suggest, by the mere removal of ill-placed, useless shoots, leaving the true wood reserved for next year (to become mature and firm), till in February the proper regulation takes place.

Vines in the open air are to be left untouched, after the fruit is gathered, till the fall of the leaves. Those in the latest vinery may be preserved very long if the flues be brought into lively action every cold, clear morning, giving front and back air. In wet weather keep close and cool as possible. Decaying leaves, and weak, useless shoots, should speedily be cut off.

This is the best time to transplant any kind of deciduous tree and shrub. The preparation of the ground is the main thing. It should be made fine, and the space wide. Every root ought to be expanded, laid evenly on, and covered with the pulverized earth, watered, and pressed firmly. Trees with tall stems should be duly supported in two directions by sloping stakes, and mulched by littery manure laid upon the covering earth.

Strawberry-plants are dressed for the winter. Take off the useless runners; rake the beds with a wooden rake; remove every weed; and spread manured earth over the whole: the early spring regulation will finish the work.

PLEASURE GROUNDS.

Leaves fall rapidly, and these are admirable dress as preservers of vegetation from frost: they therefore ought to be retained on the surface of the shrubling ground; but the lawn and walks must be repeatedly cleared by sweeping, and removing them to the compost ground to become leaf-mould. Laurel-leaves are objectionable; but those of all the deciduous trees, when decayed and mixed with white sand, form a valuable substitute for bog or peat earth.

Herbaceous plants can be set, removed, divided, &c., according to taste; but we prefer to leave everything quiet till the season of growth approaches. Many plants perish by remaining torpid for months after removal; and no time is gained, protection being the chief object of good gardening at this season.

GREEN AND FLORAL HOUSES.

Give all the air possible during fine and dry days. If frosts occur, light gentle night-fires in the latter, especially if tender stove-plants are cultivated.

Nature is sinking into inactivity; and we gain nothing by excitation. Therefore *gloxineas*, and all the *gesneræ*, should be placed sideways, and kept dry till the spring, when, if undisturbed now, they will revive and become vigorous in proportion to the rest they have enjoyed.

Stove *evergreens* will, however, require a temperature of 55 to 60 deg., and occasional moderate waterings.

We recur to the weather. Its beauty, even at the close of the third week, is almost unprecedented. With the wind brisk at east, there is a temperature of midsummer; sun very powerful; nights balmy and serene. And now the singular fact may be recorded, that, excepting the thunderstorms, and a few wet days in July, there has been an almost tropical summer ever since the 20th of May; that is, during four calendar months. The soil is dry, and rain would be most acceptable.—Sept. 21.

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR SEPTEMBER.

This has proved a remarkably fine month for all agricultural operations; and it is very gratifying for us to be enabled to observe that nearly, or quite the whole, of the grain crops have been secured in England in the most admirable condition—a condition, indeed, seldom equalled at any previous corresponding period of the year. Harvest work may, therefore, be considered as concluded at least a fortnight earlier than the average of many preceding seasons. Were we able to report so favourably of the general produce of the crops, our task would be doubly gratifying; but here we find abundant matter for the most serious consideration not only of those immediately engaged in farming, but the community at large. In the first place, we shall here particularly allude to the produce of this year's wheats. As might be expected (such being generally the case when the flail is not in motion) the accounts from some localities vary as to the yield of that description of produce. Still, however, the result of our most diligent inquiries is, that it amounts to about an average. Although we feel justified in thus estimating it—and which estimate in ordinary and otherwise abundant seasons would lead us to the conclusion that very moderate prices would be obtained for some months to come—it is placed beyond a doubt that the value of wheat will rule very high during the approaching winter. Notwithstanding the sales of English wheat in our various markets this year have fallen short of those in 1845, according to the "Gazette" returns, by upwards of *one million quarters*, the stocks of old corn now on hand are small; and it is a well-ascertained fact, arising from a greatly increased consumption, that a very large portion of the foreign grain and flour released under the new corn bill has already passed into consumption. Again: the quantity of all kinds of spring corn produced this season is unusually deficient, arising chiefly from the long-continued dry weather; and another more important subject presents itself to our notice—that of a decided and alarming failure; a failure not confined to England alone, but extending throughout Ireland and Scotland—in that invaluable esculent, the potato. We are not alarmists; but we look upon these undeniable facts as indicative of scarcity and high values. But we may be told that the falling off in the supplies of home "bread-stuffs" will be made good by foreign importations. That we conceive to be IMPOSSIBLE. Doubtless, the present comparative facilities offered by the legislature for the importation of grain will stimulate the foreigners to increased exertions; and every effort will be made by speculators to import additional supplies of wheat; yet, on the other hand, we must not forget that France, Belgium, and Holland (in which countries a great scarcity of grain presents itself) are requiring wheat for the consumption of their inhabitants. From London, as well as the outports, large quantities of both wheat and flour have been exported to the continent, where prices are ruling exceedingly high—much higher, in some instances, than with us. Under these circumstances, we give it as our decided opinion, whatever may be advanced to the contrary, that a very great rise will take place in the value of wheat ere long.

The abundance of pasture has been most beneficial to live stock in general, which has fared exceedingly well. In some of the large hay districts the cut of aftermath has been large—beyond recollected precedent. We regret to state that the epidemic is raging in the north to some extent, though the actual losses experienced by the graziers have not equalled those of some former years.

In some quarters great complaints are made of the growing turnips, which appear to have become affected with a disease somewhat similar to that which has attacked the potatoes. On the latter subject we may observe that we have received numerous suggestions to arrest its progress. Some of the proposed remedies may be very good in their way, but others we look upon as positively dangerous and unsafe. For instance, a gentleman in Suffolk suggests that diseased potatoes should be steeped in a strong solution of *corrosive sublimate,* in other words, to kyanise them; but this system might, if acted upon, be attended with the most lamentable consequences, as it is well known that corrosive sublimate is a *virulent poison,* and cannot consequently be safely given to human beings except by a skilful medical practitioner. We mention this to show the care that is absolutely necessary in carrying out such experiments. It would be impossible for us, not knowing the originating causes of the disease, to lay down any positive rule for our readers to act upon; yet it appears to us that *autumn planting* would materially tend to lessen its existence, for we are aware of several fields having been lately dug up (and which were planted with potatoes last year), the produce of which has entirely escaped.

The cattle markets and fairs have been active, and unusually high rates have been paid for both fat and store animals. Upon this subject we have enlarged in our Cattle Trade Review.

The crops of clover and other grass seeds have turned out good, both as respects quality and quantity.

In Scotland most of the grain has been secured; and complaints are made as to the potato crop, as well as that of spring corn. The produce markets have ruled active, at a considerable advance in the quotations of most articles.

Very deplorable accounts arrive almost daily from Ireland. Poverty and distress are everywhere apparent in that island, and we entertain very great doubts as to the ability of the farmers to supply us with their usual quantum of corn and cattle for some time hence. Prices of all commodities are extremely high, with little or no prospect of their going lower.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

On the whole, this has been one of the most important months, as respects supplies and prices of stock, experienced for some time past. Throughout the provinces the various fairs have been but moderately supplied with store animals, which have met a very active demand, at unusually high rates. The fat stock markets have also ruled very firm, and the quotations have been again considerably on the advance in most instances, notwithstanding the supplies on offer have been seasonably extensive. This improvement in value, coupled with a very great increase in the imports of live stock under the new tariff, have, it would appear, produced feelings of great satisfaction amongst the free-trade party that their views on this question have been correct ones. It is quite true that, so far as we have yet progressed, those arrivals have had no sensible effect upon the value of home-fed beasts or sheep; but, as practical men, we are bound to trace the causes which have produced the present state of things. Our readers will agree with us that up to the present time our graziers have not recovered, notwithstanding the present has been a tolerably good season, the effects of the drought in 1844 (when immense numbers of sheep were forced upon our markets, owing to the want of fodder, in less than a half-fat state, and which, as is well known, produced the most disastrous consequences to the flockmasters); indeed, it is well known that in many parts of the country a great scarcity of stock still exists. This circumstance, then, together with the large sales effected in Smithfield (which market has, it is well known, a regulating influence over every other in the kingdom) for the western and southern counties, has resulted in high currencies being asked and obtained for most kinds of stock. There is another equally important fact deserving of notice—namely, the increase in the population in most large towns, and the non-increase of our productive capabilities, so far as cattle are concerned. Another season or two, when increased capital shall become invested in the soil, and our productive capacities fully developed, will most assuredly test the value of free-trade doctrines.

We regret to state that in many parts of the United Kingdom the beasts are still suffering from the epidemic; and in some quarters complaints have arisen of the sheep-rot. These complaints are not confined to home-fed stock, as we have witnessed several large importations of foreign beasts and sheep similarly affected, and which, by the way have been allowed admission into our markets, although we have been assured that every precaution is taken by the Customs' authorities to prevent the landing of diseased animals.

In the month just concluded, the annexed supplies of foreign stock have been received in the metropolis:—

From whence.	Oxen.	Cows.	Sheep.	Lambs.	Calves.
Hamburgh..	84	25	77	—	22
Leer	105	130	3037	—	10
Rotterdam..	571	521	3582	128	232
Harlingen ..	113	1634	5144	56	217
Flushing ...	—	—	203	—	—
Denmark ..	20	78	—	—	—
Ostend	32	74	431	49	29
Total ..	925	2462	12474	233	510

The above shows a grand total, into London, of not less than 16,604 head, being by far the largest importation in one month upon record. It has been long argued, with what truth is here fully exemplified, that the foreign graziers have had no stock to spare for us worthy of notice; but here we have proved that every succeeding month brings with it increased supplies. As to the quality and condition of these arrivals, we may state, with the exception to which we have just alluded, that they are rapidly improving; indeed, we may state that not a single head of beasts or calves has reached us in anything like a half-fat state during the whole of the month; and further, we know for a positive fact that the speculators are realizing a very large profit by these importations. In the sheep a very great improvement has taken place; and it is most important for us to notice that many of them bear signs of having been crossed with some of our best black-faced breeds. Formerly this stock, though they carried a large quantity of internal fat, came to hand in bad condition; but from the evident change in the system of feeding in Holland and elsewhere, we have now the fat on the backs. Consequently, they are better suited to the butchers, who purchase them readily.

At the outports, the arrivals from Holland and elsewhere have been extensive, as will be seen by the following statement:—

	Head of Stock.
Hull	2,324
Newcastle	312
Bridlington	20
Plymouth	70
Southampton	108
Total	2,834

Full average supplies of stock have been on offer in Smithfield. Still, however, the general demand has ruled active. Beef has produced very full prices, while mutton, lamb, and veal have advanced from 2d. to 4d. per 8lbs., and clearances have been effected on most days. Beef may be quoted at from 2s. 10d. to 4s. 2d.; mutton, 3s. 10d. to 5s.; lamb, 4s. 10d. to 6s.; veal, 3s. 10d. to 4s. 10d.; and pork, 3s. 10d. to 4s. 10d. per 8lbs., to sink the offals.

The supplies have been as under:—

	HEAD.
Beasts	18,611
Cows	447
Sheep and lambs	154,260
Calves	2,167
Pigs	2,591

Compared with some former years, the above exhibits a decided increase.

The bullock-droves have been derived a under:—

	HEAD.
Northern counties	7500
Eastern do.	900
Western and Midland do. . . .	2700
Other parts of England	1900
Scotland	200
Ireland	150

The remainder of the supplies has been derived from abroad and the neighbourhood of London.

Up to Newgate and Leadenhall markets the arrivals of country-killed meat have been very trifling — namely, about 270 carcasses of beef, 980 do. of mutton, 300 do. of lamb, 270 do. of veal, and 570 do. of pork. Generally speaking, the demand has ruled active, at improved currencies. Beef, from 2s. 10d. to 3s. 10d.; mutton, 3s. 6d. to 4s. 10d.; lamb, 4s. 10d. to 5s. 10d.; veal, 3s. 10d. to 4s. 8d.; and pork, 3s. 10d to 4s. 10d. per 8lbs., by the carcass.

BERKSHIRE.

Since our last the weather has proved of so resplendent a character that it is hardly needful to say the harvest has everywhere been completed in the finest condition. When we inspect the meteorological tables, and perceive the barometer to have averaged far above 30 inches during the first eighteen days, with scarcely a cloudy interval, the conclusion is inevitable that September had, so far, surpassed its ordinary character. On one occasion, after a midday heat of 81° (Sep. 6), there was night lightning, followed on the 7th by a grand and peculiar thunder-storm. During two hours of the afternoon the lightning was sublime beyond description; and the peals of thunder which followed (in our locality) at nearly regular intervals of 10 or 12 seconds, were deep, and altogether magnificent. This storm brought a copious shower, and in this consisted all the rain that the east of Berkshire enjoyed till the 21st; then the wind became strong and wavering, and as the autumnal equinox occurred on the 23rd with change to the south, there were prognostics of a speedy supply of rain and, perhaps, of a moist and windy winter. Our Berkshire farmers talk much of a great deficiency in the wheat crop: the general reports are far different, and time must determine the facts. All agree that oats, barley, beans, and peas are below their average, and the account of potatoes is lugubrious. There can be no doubt that the early and prodigious heat had been too great for the perfect security of the wheat, and the drought far too early and protracted for the spring corn. As to potatoes, the crops must be defective for want of early rain; but in respect of quality daily proofs are most delusive, if there be not plenty of sound and good tubers everywhere to supply the table. Evidences are given, by writers far beyond the suspicion of any attempt to mislead, that the causes of the malady will be temporary, and the results by no means so alarming as we were led to infer. Autumnal planting may be very prudent; but it should be made rather deep, and without manure, in order to secure the sets from frost and from liability to putrescent fermentation before they sprout in the spring. Until the equinoctial rains fell, ploughing was considerably retarded; now, however, there can be no causes of delay, and wheat sowing is likely to be effected without let or obstacle. It is impossible to offer a strong opinion concerning the best, or even a superior method of sowing; because that is rendered local and arbitrary in consequence of the vast difference of soils. Drilling or pressing must be considered advantageous, the latter being preferable in the lighter soils, because both offer great facilities to the future cleaning of the land. Dibbling economises seed, but an extensive tillering follows, not simultaneously but in detail; and this produces irregular maturity. The grass now promises to be abundant, and this ought to check the serious advance in the price of butter, which, among other circumstances, tends to render the winter prospects of the poor more gloomy than it was expected they would be. Meat, bacon, cheese, bread—all advance, and threaten to command higher prices. Nothing, in a word, is cheap excepting sugar: such a state of affairs and prospects is in every respect to be deplored. Having lately had an opportunity to pass through several counties, we may be permitted to offer a few extended remarks upon present appearances. First, then, concerning hops: the fields in Kent, especially about the neighbourhood of Tunbridge, were very various. The plants appeared clean, some very fine, and the produce abundant. Others were feeble comparatively; in the course of one week, however, the hops were chiefly gathered, and report states that the harvest thereof is upon the whole good and ample. In no county have we observed so much verdure as in Berkshire and some part of Bucks adjoining. The stubbles in Kent remained untouched, and, in fact, so severe had been the drought since the harvest that the plough could not penetrate the stiffer lands which there abound; therefore the aspect of the county was brown, and the more so as the foliage of the trees was prematurely falling. We heard of deficiency in the crop of apples, and of fruit generally; also, that nothing would keep, decay coming on rapidly. In our own vicinity we know that orchards, which at the late low prices would bring £10 or more, have not now produced above ten shillings. Walnuts form an exception: they seem to be abundant and cheap. In 1845 the crop was wretched—at least with us. Upon the whole, results have proved that excessive heat in June is injurious to every kind of crop, and that such heats having occurred to a greater or less extent in 1845 and 1846, much of the mischief incurred may be referred to their agency. —Sept. 25.

NORTH DERBYSHIRE.

We have good reason to congratulate our common country on the favourable termination of the harvest. The wheats will be a little sprouted, but not to any injurious extent. It is a rare circumstance for oats growing in the Peak to be cut and carried in August; more frequently the time of harvest waits till October. We have thrashed no corn of this year's growth, nor have we had an opportunity of ascertaining the probable yield; but we think it will scarcely be an average, particularly of Lent corn. We would not venture to speculate on what may be the price of provisions during the ensuing winter; much depends on American imports, and the extent of the potato blight; for we apprehend we shall not receive any great weight of imports from continental ports. This assumption is strengthened by the fact that our stock of foreign wheat is being reduced by exports to France and Belgium, through the deficient harvest of the present year. We would, therefore, advise our farming friends at this juncture *not* to force their produce into the market. The blight in the potato crop is general, and much more serious than last year. We state from our own observation and inquiry, that in those cases where the tubers have remained in the ground all the winter, and not taken out before the time of planting in the spring, there is little or no disease; and that disease, small though it be in the above, proceeds in our opinion more from contact than hereditary tendency in the tubers. We are acquainted with one case, where the grower (more from indolence and inattention than any other cause) always allowed his seed potatoes to remain in the ground during the winter, and not unfrequently has them injured by the frost, where there is not at present in the crop any appearance of disease. Fears are entertained that the potato blight is not the only blight in the vegetable kingdom. Turnips in some degree are affected by mildew, particularly the early sown Swedes; and the common turnips, on dry and gravelly soils, are affected by the complaint called "fingers and toes," but we think no fears should be entertained of any connection or similarity between the turnip and the potato disease. The early harvest and continued fine weather have enabled the farmer to plough and prepare his stubbles for future crops. Nothing so much conveys a proof of activity in the farmer as an early attack on the stubbles at harvest, and certainly nothing can be more important. Cleanliness to the soil is manure applied at little expense, and future crops very much depend on it. We therefore hope this practice is now generally adopted. Store stock is very dear and scarce, and provender abundant. It is very likely that beef and mutton will obtain a good price for some time to come. The trade in wool does not present any animation, and prices have a tendency to recede.—Derby Reporter.

SOUTH LINCOLNSHIRE.

The harvest in this neighbourhood being now completed, I send you a few particulars in reference thereto: The wheat crop was all in stack by the last week in August, and mostly in very good condition; the season, from sowing to the earing, was generally so very favourable, that this crop gave the most abundant appearance ever seen; but the heavy showers at the latter end of June caused it to go down, and it remained much laid, and in some instances the ear was much shortened and badly filled; on reaping and stacking, it turned out very abundant as to straw. The weather continuing so very fine, and prices tempting, our farmers have thrashed very freely; the result is, yield in some instances is very great, quality and condition very good, weight from 61 to 65lbs. per bushel—so that upon the whole I estimate this crop will rather exceed an average. Oats a less breadth; and although seed time was unfavourable, this crop proved pretty good on reaping, and the acreage produce will be an average one. Beans came up and flowered very well indeed; but the sun being so intensely hot scorched a great proportion of the flowers off; then the " smother fly" attacked them, so that altogether the yield will be very short. Peas vary much, but upon the whole will prove a very short crop. Barley, none grown scarcely. A much less breadth of potatoes planted than usual; up to July they looked most luxuriant, but at the latter end of that month the leaves began to decay, and the stench arising therefrom was very great; about ten days after this the disagreeable scent had nearly left them, although the decay of the leaves and stem was slowly progressing; up to the present time the root is not generally injured, though I have my fears it may ultimately prove they will be; one thing is certain—the acreage yield will be very short. Hay crop was good, but the " eddishes" (or after grass) are very poor. Turnip and coleseed crops were very much taken off by the " fly," and altogether will be short of keeping. The stock of old wheat in the farmers' hands at harvest day rather large, which, with new, has caused our supplies to be very large these last few weeks; the " return" at Wisbech, week ending 28th August last, being 10,455 qrs. 6 bush. (one-fourth larger than any one week in 1844 or 1845); prices have opened much higher than they otherwise would have done, had not the dread of scarcity arising from the reported failure of the potato crop in Ireland, England, and Scotland, led to our millers going freely into stock, and speculators buying also largely.—Spencer's Circular.

AGRICULTURAL QUERIES.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

SIR,—I should be very glad if any of your correspondents could inform me of the result of their experience in using the superphosphate of lime *alone* as a manure for beans; for I hear a great deal about its cheapness, and happen to be rather short of farm-yard manure.

I am, sir, your obedient servant,
A YOUNG FARMER.
Berryhill, Etal, Northumberland,
September 11, 1846.

ON THE ROTATION OF CROPS.

TO THE EDITOR OF THE MARK LANE EXPRESS.

SIR,—Like as legendary tales are carried down from parent to child, so in general is the system of management of land. " It was so in my father's time, and thereit must be right." This following out of an old-fashioned system, no matter whether it be the best one or not, would in other circumstances be laughed at and called quackery, unless the party pursuing the system could demonstrate himself to be right on something like scientific grounds. Now I am not so foolish as to attempt to disprove the correctness of the generally-adopted system of the rotation of crops; but what I should like, with your assistance, to learn as a guide for my own exertions is, the philosophy of the rotation of crops. Perhaps you, or some reader of your widely-circulated paper, could direct me in this emergency, and either himself give me the information I am looking for, or direct me to a source from whence I can obtain what I want.

Yours, Mr. Editor, A YOUNG FARMER.
Sept. 19, 1846.

ON THE TRUE PROPERTIES OF LIME.

SIR,—Allow me to make you the means of coming to the fact, if I can, as to what the true properties of lime as a manure are and whether it is best adapted as an application to rich lands or poor lands; also what are the true effects of lime upon exhausted soils? And is lime in itself truly a nourisher to plants? or does it only stimulate to action such nourishment as was in the soil previous to the application of the lime? These, Mr. Editor, are questions that have been mooted more than once at a Farmers' Club which I attend; and as the learned ones amongst us take opposite views on the subject, perhaps some kind contributor to your paper, who may be acquainted with the subject, would step forward as umpire in this knotty case, and so relieve from bewilderment, Mr. Editor, your

Sept. 18, 1846. CONSTANT READER.

COMPOSTS WITH URINE.

SIR,—Being desirous of economising as much as possible the contents of my cow-yard, and being impressed with the idea that by making a compost with the spare urine and vegetable mould, &c., I should be obtaining the desired end, I should feel obliged to any of your correspondents who would favour me with his advice and the results of his experience on the subject; a little instruction as to arrangement of receptacle for the urine, with the best mode of combining the mould, &c., with the urine, &c., with the probable effect of the same when applied as a manure, would oblige, sir, yours respectfully, W. WALTERS.

Sept. 14, 1846.

INDIAN CORN.

SIR,—An American gentleman was lately telling a friend of mine that they were discontinuing the use of Indian corn in America as food for horses, in consequence of its producing tetanus, or lock-jaw. I shall feel obliged by being informed by some of your numerous correspondents if they have experienced any such results from the use of it, and also what is the best way of preparing it for working horses. Some people here give it in a bruised state, mixed with bran; others pour boiling water on it, and give it as a mash. By inserting the above, and also the answer, in your valuable paper, you will oblige your obedient servant, R. W.

SIR,—I am intending to build a number of pig cotes for feeding pigs in, and am anxious, before I commence, to have your opinion as to where I could meet with a statement of the best plans of cotes for pig feeding.

Yours, truly, A SUBSCRIBER.

SIR,—Seeing in your paper to-day a letter from Mr. Pigott, on the property of malt for feeding, I should feel obliged to that gentleman, or any other of your correspondents, for their opinions respecting the properties of boiled and ground barley, of equal quantities for fattening, or producing milk.

I am, dear sir, yours, &c., A DAIRYMAN.

ANSWERS TO AGRICULTURAL QUERIES.

TO THE EDITOR OF THE MARK LANE EXPRESS.

SIR,—A subscriber from Spalding asks you to obtain for him "a recipe for destroying wules, the insect so destructive to grain, and more especially to malt." It is difficult to state what will destroy the larvæ of the wule or weevil, particularly if the garner or store room continue to be employed; a year's rest, with frequent lime washings, are requisite for the extirpation of the insect. For removing both the grub and the insect, or the worm and the weevil from grain of any description, no method is effectual save that of reeing the grain with a sieve, which brings not only the worm and weevil to a head in the centre, but also the grains damaged by them. The most perfect means for the purpose is a machine invented and patented by parties almost neighbours to subscriber; viz., the Reeing Machines, patented by the Messrs. Tuxford and Sons, of Boston. I have seen machines made by them of a portable kind, for the use of maltsters and corn merchants, and have a fixed one in my own mill; the valuable advantages to be derived from using the same have been tested during several years' experience by, Mr. Editor,

Aug. 27*th*, 1846. A MIDDLESEX MILLER.

COMPOSITION OF VEGETABLE MATTER.

SIR,—Your correspondent "Young Investigator" will find, by analysis, that organized vegetable matter affords mucilage, starch, albumen, gluten, and sugar, as well as small portions of other substances. These substances are all composed of carbon, hydrogen, and oxygen. Some have also in addition a portion of azote; and these primitive elements, forming the substance of all vegetable matter, are the same as those which constitute air and water. I am, Mr. Editor, yours,

Sept., 1846. CHEMICUS.

SIR,—Observing a letter addressed to you in the *Mark-Lane Express*, signed "R. W.," wishing for information as to the mode of preparing Indian corn for working horses, I beg to inform you for his intelligence that in Portugal and Spain (I having been a resident in the former country for some years), where the article is much cultivated, it is given to their horses and mules in preference to oats, as being more nutritious, without any preparation (merely thrown into the manger). Their pigs, poultry, &c., are also fed upon it in the same way, without any preparation. It is ground also into flour, and made into bread; the inhabitants eating it, generally, at their dinner. I am, Sir, your obt. servant,

Liverpool. Sept. 15*th*, 1846. X. Y. Z.

If "A Subscriber," who inquired in our last publication about "pig cotes," addresses J. D., 4, North Cumming-street, Southampton-street, Pentonville, he will obtain the required information.

MR. GOODMAN'S SOUTHDOWNS.—On Thursday, the 3rd instant, Mr. Samuel Donkin offered about 120 of the celebrated Chevington southdowns to public competition. Mr. Goodman having entertained the company to lunch after his usual elegant style, and unequivocal proofs having been given of the perfect agreement between 40 years' old port, the finest Madeira, and the primest southdown mutton, the auction commenced with the most spirited bidding, evincing a growing anxiety to test the merits of a breed of sheep which is now attracting very general attention amongst the farmers in the north. Be it remembered, while looking at the subjoined averages, that the stock sold was taken from the general flock, and had received no extra indulgence. The principal purchasers were—Mr. Harbottle, Anick Grange; Mr. Fenwick, Ulgham Grange; Mr. Muers, Warkworth; Mr. Davidson, Tritlington; Mr. Bell, Hope House; Mr. Row, Paxton Dean; Mr. Straker, Chibburn; Mr. Embleton, Fenrother Lane. Average price: tups, let for the season, 5*l.*; tup lambs, sold 4*l.* 2s. 6d.; ewe lambs, sold 1*l.* 17s. 3d.; ewes, aged, sold 2*l.* 15s. 8d.; gimmers sold 3*l.* 2s. 8d.—Berwick Warder.

AGRICULTURAL INTELLIGENCE, FAIRS, &c.

CASTLETON FAIR.—There was as good a show as was exhibited last year. So far as we could calculate, there were full 14,000. Prices, half-bred lambs, from 12s. to 17s.; Cheviot wedder lambs, from 8s. to 12s.; a few lots sold at 13s.; ewe lambs, (Cheviot) 8s. to 11s. The demand was exceedingly good, and a great many who intended to purchase were disappointed.

CHESTERFIELD FAIR.—The show of cattle was not an average in numbers; the predominant portion were barren stock. There was a good demand for milkers and prime young stock, which found ready sale at what were considered high prices. In the morning, a slackness was manifested before 12 A.M.; and as late as 5, P.M., there were numbers of barren cows unsold. The show of horses was, as of late, inferior in general; some few fine animals fetched high prices. Mr. Johnson, horse-dealer, of Calow, had a splendid cart-horse, rising four years old, for which he asked upwards of 40 guineas; and we heard he was sold. Very few foals were offered, and a good price asked for anything promising. We had a great number of sheep penned, for which higher prices were asked than found customers, and a great portion were driven away unsold. A greater number of pigs were offered than we have before known at this fair, and high prices were asked; there was not a great amount of business done upon the whole. We had a very large pitch of cheese on the ground, which found ready sale, according to qualities. Blend milk, 40s. to 46s.; inferior new milk, 54s. to 60s.; prime dairies, 62s. to 68s.

BEAMINSTER FAIR was not so numerously attended by dealers as in the corresponding period of last year. The great fair at Woodbury-hill taking place on the same day may account for this deficiency. The demand, however, for sheep, of which nearly 2,000 were penned, continued very brisk, until the whole of the pens were cleared at the following prices, viz., horn ewes, from 37s. to 54s.; Down ewes, from 36s. to 37s.; horn lambs, from 26s. to 28s.; Down ditto, from 24s. to 26s. Beef averaged 10s. per score. The sale of pigs, of all sizes, was dull, ranging from 10s. to 36s. per head, owing probably to the shortness of keep from the failure of the potato crop. Skim milk cheese realized about 32s. per cwt. Onions, of which a great quantity is generally sold at this fair, were more than double the price of last year, fetching 1s. 6d. per peck.

CHERTSEY FAIR.—There was a tolerably good supply of stock, but the cattle owners held back for high prices. Well-bred milch cows sold off quickly at prices of 17 to 18 guineas, and large-framed Yorkshire-bred cows met prices as high as 22 and 23 guineas, including a suckler by their side. Cows to calve down made from 15 to 17 guineas; heifers fetched from 10*l.* to 12*l.* a-head, and young store beasts from 14*l.* to 17. each. Sound and young cart-horses brought prices varying from 16 to 24 guineas, and colts from 12 to 18 guineas each. Pigs maintained high prices; small pigs fetched from 11s. to 16s. each, and strong store hogs made prices ranging from 17s. to 29s. a-head; good breeding sows made from 35s. up to 55s. each.

CARLISLE FAIR.—There was a good show of cattle, sheep, and lambs, which brought extreme rates. This has been the best fair we have had of late, and sales were, in the generality of cases, speedily concluded. The show of sheep was good, though not so numerous as at the last fair, and, with the exception of black-faced, for which sales were languidly effected, mostly all the other descriptions were sold. The following were the current prices of the day:—Half-bred lambs brought from 15s. to 1*l.*; Cheviots from 10s. to 15s. There were a few black-faced shown, which sold at prices varying from 7s. to 10s. The show of cattle of all descriptions was good, and, though there were plenty of buyers, purchasers were cautious in their operations in consequence of the high prices demanded. Best two-year-old Galloway bullocks brought from 8*l.* to 11*l.*; Galloway stirks from 5*l.* to 6*l.* 10s.; three-year-old Highland bullocks from 8*l.* to 11*l.*: two-year-olds, from 6*l.* to 8*l.*; heifers, from 8*l.* to 11*l.*; two-year-olds from 6*l.* to 8*l.* The fair, upon the whole, was better for cattle of all descriptions than the previous one. There was a numerous show of horses at this fair, but the qualifications of the mass were anything but of a first-rate character. The prices realized were much beyond the rates obtained at last fair.

LEWES SEPTEMBER SHEEP FAIR.—The "great" September fair has on this occasion, in one respect, almost forfeited its claim to such a title, not more than between eighteen and nineteen thousand sheep having been penned; a number smaller, it is stated, than was almost ever known. Pens were bespoke for many more sheep than were sent; and the inference is, that owing to the high prices at the recent fairs in the county, and to the sums bid at the Glynde and Landport sales, many lots were forestalled on their way to the fair, or were purchased out of the hands of the farmers on their own lands. We know of one gentleman whose ewes were bespoke several days ago at 40s., and there is reason to suppose that several bargains of a similar character were made at the end of last week. With regard to prices there were, as is and always must be the case on such occasions, many different variations and gradations of price, according to quality. As a general average, ewes may be said to have ranged from 30s. to 32s. and 36s. and 38s., while 40s. was not an unfrequent price. We hear of one pen of prime ewes, belonging to Mr. Rigden, having realized 50s. Mr. W. Ridge made, it is said, 44s. for some. A lot belonging to Mr. Farncombe fetched 40s., but they quickly changed hands again, being re-sold at 42s. Lambs fetched from 20s. to 32s., and at the latter prices, or 33s., for we could not precisely ascertain which, a lot bred by Mr. Emary, of Storrington, were disposed of. Mr. Alfree of Iford, had a nice lot of ewes, which readily obtained 36s., while he also made 26s. of his lambs. Since writing the above, we learn that Mr. Saxby, of Rottingdean, sold a superior lot of shearling ewes at 4*l.* 10s. per head! They were bought by Mr. Thompson, of Knowsley Hall, Lancashire. Mr. Saxby's first pen of old ewes realized 40s., and a culled lot 32s. His second lambs brought 22s. and 21s. 6d.—*Sussex Advertiser.*

MINNYHIVE LAMB MARKET.—This market is chiefly for second and third lambs. We are happy to be able to report that on the present occasion 48 lots were exhibited, the aggregate of which amounted to upwards of 3,200, the whole of which found a ready market, at higher prices (with the exception of black-faced ewe lambs) than we ever remember the same description of stock to have attained to in this part of the country—prices, indeed, equal to those obtained for top lambs, if we except a few of the leading lots, at the August market. Crosses between the Cheviot ewe and

Leicester ram, from 17s. 6d. to 12s. 6d.; Cheviot ewe lambs, 11s. 6d. to 8s.; do. wedders, 12s. to 8s. 6d.; black-faced ewe lambs, 8s. 6d. to 5s. 6d. There was also a considerable amount of business done in draught ewes, at a considerable advance above last year—Cheviots not less than 1s. 6d. or 2s. a head.—*DumfriesHerald.*

THE SALE OF STOCK AT MR. DOMMETT'S, AT PAYHEMBURY.—The sale of the prime stock at Mr. Wm. Dommett's, at Uggaton, in Payhembury, by Mr. James Hussey, of Honiton, auctioneer, was the subject of very general conversation in Exeter market on Friday, in consequence of the extraordinary prices the cattle and sheep brought. It was well known that Mr. Dommett had been most particular in the selection and breed of his stock, and there was a large attendance of agriculturists, among whom the competition as to who should be the purchasers was very smart. Accordingly it was stated on Friday, that breeding ewe lambs fetched in some instances from 40s. to 42s. a piece; and that the average price of lambs was 35s. a piece. So also that sheep averaged about 45s. a piece; and the bullocks 16*l.* a piece: indeed every thing sold well.

SALE OF CART HORSES.—At the sale of the late Mr. Hayward's farming stock, at Ringshall Hall, by Mr. R. Garrod, the first team of four horses (bays) realized 166*l.* 19s., and the horses and colts, altogether 16 in number, averaged 30*l.* each.—*Ipswich Express.*

SALE AT WOODCOTE FARM, CROYDON. — On Wednesday last a large attendance of company assembled at Woodcote Farm, near Croydon, to witness the sale of the excellent Southdown flock belonging to Mr. Weall. The proceedings were conducted in an efficient manner by Messrs. Blake, the auctioneers. The sale was spirited. The ewes were in low condition, in consequence of having been folded up to the day of sale, and there being no fancy pens of any age, the prices fluctuated but little. The 2,000 sheep averaged, for the ewes, about 36s., and the lambs 24s. The first lot of young ewes were by a ram of Mr. Thomas Ellman's, in low condition, the highest price for which was 42s. The next lot of young ewes (80 in number) were the produce of Mr. Jonas Webb's ram; these were in good condition, and had evidently had better keep, which was proved by the flesh and wool, the latter being of a darker hue, the highest price for which was 41s. These facts show that there is a great preference on the part of flockmasters, in this part of England, for the Sussex breed. The objection urged against Mr. Webb's blood was the *character* of the face, and bareness of wool about the head.—*Sussex Express.*

REVIEW OF THE CORN TRADE

DURING THE MONTH OF SEPTEMBER.

The weather has throughout the month been splendid, and most favourable for finishing the harvest in the late districts. The crops may now be considered secure, little corn remaining abroad even in the mountainous parts of Scotland; the reports as to the yield vary materially, but that much too sanguine an estimate was formed of the probable result previous to cutting being commenced is universally acknowledged. The want of rain, and the extreme heat of the weather during the greater part of the summer, had, it would appear, a more unfavourable effect on vegetation than was at the time supposed. Even wheat, a plant not easily injured by drought, suffered considerably from this cause, and instead of giving so abundant a return as was calculated on, will, it is now thought, barely exceed an usual average in quantity. The quality is, however, finer than in ordinary seasons, and the weight per bushel great. In all the southern counties the greater part of the wheat crop was secured in excellent order; but further to the north, where it was not ripe quite so early, more or less injury was done by the heavy thunder showers experienced in the beginning of August. In some localities the grain sprouted as it stood in the sheaf, and in other districts where it had been put up in stack the quality was injured by the rain penetrating; still, on the whole, we think there exists little reason to complain of the result of the wheat harvest; though, as yet, we have hardly the materials for forming a very accurate judgment. It is true that farmers generally express themselves dissatisfied with the yield to the acre; but it does not necessarily follow that the crop falls short of that of average years: it must be borne in mind that expectations were, in many cases, unreasonably high; indeed, before the test of thrashing had been tried, so abundant a return was calculated on, that many looked for extreme low prices, and it was then deemed probable that good qualities of red would not realize more than 40s. per qr. to the grower. The rapid and important rise which has since then taken place must not, however, be attributed to shortness in the yield of wheat, but to the extensive failure which has taken place in the potato crop.

The disorder which has now attacked this useful root two seasons in succession manifested itself much earlier this than last summer. In its early stages it excited comparatively little attention; but when it was subsequently discovered that the disease was rapidly extending to all quarters of the kingdom, serious alarm began to be entertained; and so general has the conviction now become that the failure will prove far greater than last season, and an immense extra consumption of flour be caused thereby, that no one dreams of low prices for wheat. We are not aware of what breadth of land is usually devoted to the growth of potatoes in the United Kingdom, and are therefore unable to form a very clear notion of the amount of food lost; as, however, it is well known that several millions of the inhabitants of Ireland depend almost solely on this article for subsistence, whilst it forms a very important item of the food of the poorer classes both in England and Scotland, the loss of even a fourth of this crop must be viewed as a very serious calamity. We fear, however, that the failure will be far greater; many estimate it at a half, and not a few look upon potatoes as doomed, maintaining that that portion now apparently sound will not keep in the pits. We sincerely hope that these evil prognostics may not be realized, or the consequences would be dreadful, more particularly as no surplus of any other sort of grain or pulse has been grown to make good the deficiency.

Of the spring-sown crops, beans and peas suffered most extensively from the dry weather in May, June, and July; and all others were effected more or less.

By the reports from the principal barley-producing counties, it would appear that only a comparatively small proportion of that grain is of really fine malting quality this year; and independent of the complaints on that subject, the accounts as to the yield are far from satisfactory. We have gone carefully over the various estimates as to the quantity grown, and hardly find one representing this crop as an average: the deficiency is, in most cases, estimated at a fourth; but many well informed farmers go further, and assert their belief that only two-thirds of a crop has been secured.

With regard to oats, the advices from different parts of the kingdom are equally unfavourable, at which no surprise can be felt when we reflect on the character of the summer, and consider how essential a supply of moisture is for the full development of this crop. In many districts the plant never attained a greater height than a foot or eighteen inches, and the heads were small in proportion. The deficiency in oats will, we feel satisfied, taking England, Scotland, and Ireland together, amount to fully one-fourth; besides which, the loss of straw is another important consideration.

We now come to beans and peas: these articles, as already remarked, suffered to a greater extent from the long-continued drought than any other. Beans podded very badly; indeed, in many cases the blossom died off prematurely without setting at all. The crop was, besides, attacked most severely by the fly; and we much question whether the produce of beans will exceed half an average in quantity. The quality is, however, remarkably fine, and weight per bushel unusually heavy. The causes which acted so injuriously on the bean crop were equally fatal to peas; and we have no hesitation in giving it as our opinion that the yield of the latter will prove fully as defective as that of the former.

It is plain, therefore, that there must, taking all the crops together, be an enormous deficiency. The potato murrain alone would, we think, have rendered it necessary for Great Britain to import largely of foreign grain; but when to this is added the falling off in the produce of all the spring-sown crops, no doubt can for a moment be entertained that we shall require assistance from foreign countries to carry us on to another harvest. In proportion as this has become manifest, holders of the different kinds of grain have gradually raised their pretensions; and as this knowledge has, at the same time, rendered merchants, millers, and dealers desirous of adding to their stocks, the inclination to buy has been greater than the wish to sell, and an advance has consequently occurred in the value of all sorts of agricultural products. As the course which the trade has taken in the London market has regulated the operations at most of the other markets, we shall confine ourselves to describing the changes which have occurred at Mark Lane.

The first important advance in the value of wheat took place on Monday, the 7th inst. In the beginning of the month the trade was rather dull; but about the period named a decided improvement was perceptible in the demand, and for some time the supply proved inadequate to satisfy the inquiry. On the day named (7th inst.) the millers bought freely, and the whole of the wheat then exhibited on the Essex, Kent, and Suffolk stands was cleared off without difficulty at prices from 4s. to 5s. per qr. above those of that day se'nnight. This great advance failed to bring forward large supplies, and on the succeeding Monday a further rise of 1s. to 2s. per qr. was established, which, with the enhancement in August, rendered the total increase in the value of wheat from the lowest point about 10s. per qr. During the succeeding week a slight reaction occurred in prices; but on the 21st the demand again revived, and though the supplies had in the interval increased, not only was the trifling abatement of the preceding week recovered, but prices again tended upwards, the sales effected on that occasion being at rates 1s. to 2s. per qr. above those current on the 15th inst. Whether the value of the article has yet reached the highest point may well admit of doubt, as we have now arrived at a period of the year when, in consequence of field-work requiring the attention of farmers, the deliveries usually fall off. Owing to the fine condition in which the new wheat has come to hand, it has brought relatively higher prices than old; and it has not been necessary to employ nearly so great a quantity of the latter for mixing as in ordinary seasons. Foreign free wheat has, therefore, moved off tardily throughout the month; but the belief that the arrivals from abroad will be exceedingly small for some months to come, has given confidence to holders. Still the rise in the value of foreign wheat has not been quite so important as that established on the best qualities of home growth. It has been difficult to exceed 65s. per qr. for the best Danzig; and Rostock (a description much liked by our millers) has not brought more than 56s. or 58s. per qr. duty paid at any period. The stocks in warehouse are gradually diminishing; but the inroads have not been so great as would have been the case if our own wheat had been secured in a less dry and sound condition. The imports of foreign have been on quite a restricted scale, whilst the exports to France and Belgium have been rather important; the quantity under lock in the United Kingdom has consequently rather diminished than increased; indeed, so difficult has it been found to secure fine quality of bonded, that a few cargoes of Lincolnshire wheat were actually bought in the early part of the month on French account. In the London market the common sorts of Polish Odessa have risen to 46s., moderately good red to 50s. and 54s., and fine Danzig to 58s. per qr. in bond, with but little offering at the rates named.

The important rise which has taken place in quotations of English wheat has begun to influence the averages; and it is confidently expected that the duty will fall to the minimum point, which, under the existing law, is 4s. per qr.; and there is scarcely that difference at present between the prices of free and bonded of the same quality. With an advance in wheat from week to week, the millers have been placed in a disadvantageous position: few had any stocks of consequence at the commencement of the upward movement, and they have not been able to advance flour in the same ratio as wheat has risen. The top price of town made was not put up to 51s. per sack until the 21st inst.; and even at that rate there can be no great profit attached to the manufacture, with runs of red wheat at 58s. to 60s., and white still higher in proportion. Owing to the want of water, many of the country mills have been unable to work, and the supplies of flour from the east coast have been trifling in the extreme. Good Norfolk households have, consequently, brought high terms, say 40s. to 42s. per sack. American flour has been much sought after, and has risen fully as much as that of British manufacture. Fine brands of United States have sold readily of late at 30s. to 32s. per barrel, duty paid; and there has been a speculative demand for the article in bond, at 27s. to 28s. per barrel.

English barley has come sparingly to hand; and in the early part of the month, extravagantly high prices were realized; for the best malting qualities, 43s. to 44s., and in partial cases even 45s. per qr. was obtained; but as the supplies increased, the maltsters became more cautious in their operations, and latterly very good malting samples have been sold at Mark Lane at 42s. per qr. Distilling sorts have met with less attention, and prime heavy parcels have been pretty freely offered at 35s., whilst for even the best grinding qualities it has been difficult to exceed 31s. to 32s. per qr. The conviction that the barley crop is short, and that this grain will be much wanted later in the year, has caused a good many orders for the purchase thereof to be sent to the continent, and prices have in consequence been run up very high abroad. This will, probably, prevent orders being executed; and, for the present at least, there is not much chance of large foreign importations.

The rise in barley has had its accustomed influence on quotations of malt, and the best season-old Ware has been held as high as 66s. to 68s. per qr., whilst corresponding rates have been asked for other kinds.

The arrivals of oats into the port of London have been unusually small, not only from our own coast, Scotland, and Ireland, but likewise from abroad. The market has therefore become very bare of good corn, and the value of every kind of oat has risen materially. The advance which has been established has been paid with great reluctance by the dealers, and the trade has been far from animated. As, however, the stock at present at this port is decidedly small, and the failure of the potato crop is likely to cause so great and extra consumption of meal in Scotland and Ireland as to render it very unlikely that the receipts from either country will be large, there seems no prospect of lower rates. Archangel oats were at one time worth 26s. per qr., duty paid; subsequently they receded to 25s., at which latter rate purchases might still be made. The quality of the Russian oats is not equal to that of average seasons, which has caused the sale to be rather difficult. Some of the yellow Danish are, on the other hand, much better than usual, and have sold at from 25s. to 27s. All sorts of British grown oats have commanded high terms, good English and Scotch feed having of late been held at 26s. to 28s., and potato at 30s. to 32s. per qr. Of fine Irish we have hardly any at market, and the best would certainly bring very nearly 30s. per qr.

Beans of home growth have come forward tardily; and though there has not been much speculation going on in the article, quotations have gradually risen. The latest prices paid have been for new ticks 36s. to 38s.; harrows, 38s. to 40s.; and for small pigeon, 42s. to 44s. per qr. Old have sold at still higher rates. Egyptian beans have been much sought after; parcels on the spot have commanded 36s. per qr., duty paid, within the last week or two; and for floating cargoes, on passage, 33s. to 34s. has been demanded, freight and insurance included.

A similar rise to that which took place in the value of peas last autumn has again occurred this year. The first parcels of new white boilers, which came to market in August, sold at 42s. to 44s. Since then the value of the article has risen rapidly, and on the 21st inst. 58s. per qr. was actually made for tolerably fine samples. Maple and grey peas have also commanded high rates, and on the day named quotations of these kinds ranged from 40s. to 45s. per qr. Under the new Corn Bill, it was enacted that the duties on barley, rye, beans, and peas, should be regulated by the average price of the first named article; and as the high value of malting barley has lately had a material influence on the returns, the duty has fallen to 2s. 6d. per qr., with a certainty of its receding to 2s., the lowest point under the existing law.

Indian corn, which at first met with little favour as an article of human food, has recently risen into great esteem with the people of Ireland, and seems also to be gaining ground in the estimation of the poorer classes at some of the provincial towns. At all events, the demand has greatly increased within the last month, and its value has risen in proportion. At Liverpool large purchases have been made for shipment to Ireland, at very high rates, as much as 46s. to 48s. per qr. having been paid for the best qualities. In the London market the transactions have not perhaps been of the same magnitude, but the advance has been equally important; and in one instance, 49s. per qr. was, we believe, realized for a parcel of fine white. Cargoes, on passage from the Mediterranean, to call for orders as to the port of destination at Falmouth, have been much sought after, and contracts have been closed at extraordinary high prices, say 42s. to 43s., the seller paying freight and insurance, and the buyer taking the risk of voyage, as far as the condition the cargoes may arrive in is concerned.

The certainty that Great Britain will have to import grain largely this year, must render the state of the foreign corn markets more than usually interesting just now; and we shall devote the remainder of our space to a few short remarks on that subject. It may be readily conceived that the movement in prices here has been quickly followed by a corresponding advance at most of the continental markets; and it is abundantly evident that to secure any quantity of wheat abroad, we shall have to pay high rates.

Independent of the influence which the state of affairs here is calculated to have on prices abroad, the result of the last harvest has not been so favourable in any part of the world as to warrant the belief that quotations will be low during the summer. Over the greater part of Germany, Russia, Poland, the Rhine Provinces, Holland, and Belgium, both wheat and rye are reported to have yielded short of an usual average; indeed, the latter crop is very deficient in many of the countries named. The potato disease, though not so extensive as in Great Britain, has also done more or less mischief on the Continent. Under these circumstances, and with the prospect of England requiring considerable supplies, prices have risen materially at all the leading ports in the Baltic.

From Danzig we learn that very little new wheat had been brought from the interior, and that the stocks of old had been a good deal diminished by shipments to Holland and Belgium; holders had consequently raised their pretensions, and really fine qualities of high mixed were held at 53s. to 55s. per qr., free on board, on the 19th inst. The high prices asked had checked business, and beyond a few purchases for shipment to France, few bargains had been closed. Freight to London and the east coast of Great Britain was 3s. to 3s. 6d., and to Liverpool 4s. per qr. for wheat.

By the latest advices from the Lower Baltic ports, it appears that the farmers had brought scarcely any grain forward, being mostly disposed to hold rather than to realize, under the conviction that prices would go still higher.

At Stettin, good wheat realized 47s. per qr. free on board in the early part of the month; and by the latest accounts from thence, we learn that sellers had become unwilling to accept that rate. Prices of all other articles had also run up. For new barley equal to 28s. to 29s. per qr. had been paid by the brewers, whilst for new boiling peas 40s. to 42s. per qr. had been asked.

At Rostock, scarcely any business seems to have been done in wheat for export, local speculators having paid prices beyond the limits of the foreign orders received there. The expectations of holders were very high at the last named port, and we should not be surprised if the price of fine wheat were to be run up to 50s. per qr.

At Hamburg, the article is almost as dear as in the London market, the best 62½lbs. qualities having realized 54s. to 55s. per qr. for local consumption, and secondary sorts having been bought for shipment to France at 50s. to 52s. per qr.

In the Dutch and Belgian markets the value of wheat and rye has been steadily advancing throughout the month, and there is not the slightest prospect of England receiving supplies either from these countries or France; indeed the probability is that the French and Dutch buyers will continue to do (what they have already in some cases done), viz., out-bid us in the Baltic.

France is also likely to be beforehand with us in the Mediterranean, from whence, however, we could hardly calculate on receiving any quantity of wheat under any circumstances, the harvest having turned out extremely deficient in all the southern and eastern parts of Europe.

Our principal dependance must therefore be on our Colonies and the United States. From all we have hitherto been enabled to learn on the subject, we have reason to believe that the harvest of 1846 has been very productive all over North America, in Canada as well as in the United States. Whatever surplus may have been grown in Canada will, of course, be shipped to this country; but it is not so sure that we shall obtain much from the States, if any other European nation should out-bid us, a circumstance by no means unlikely.

By the latest accounts from New York, we learn that Western Canal flour had risen to 4½ dols. per brl., in anticipation of a demand from Great Britain; and at Montreal a similar enhancement had taken place.

CURRENCY PER IMPERIAL MEASURE.

SEPTEMBER 28.

WHEAT, Essex and Kent, new, red	60	64	White ...60	67	70
Old, red	64	68	Do......	66	70
RYE, old	34	36	New.....	36	38
BARLEY, Grinding 29 34 Malting	40	42	Chevalier	42	44
Irish	30	32	Bere	24	30
MALT, Suffolk and Norfolk......	65	70	Brown ..	64	—
Kingston and Ware	64	70	Chevalier	67	70
OATS, Yorksh. & Lincolnsh., feed	27	30	Potato ..	32	—
Youghall and Cork, black..	25	26	Cork, white	26	30
Dublin	25	28	Westport	28	—
Waterford, white 24	25	26	Black ...	24	26
Newry	28	30	Galway..	22	23
BEANS, Tick, new	37	40	Old, small	42	48
PEAS, Grey	38	46	Maple ..	42	46
White	50	54	Boilers ..	54	60

FLOUR, Town-made 54 56 Suffolk 46 per sack of 280 lbs.
Stockton and Norfolk 42 46 Irish 48

COMPARATIVE PRICES OF GRAIN.

WEEKLY AVERAGES by the Imp. Quarter, from the Gazette, of Friday last, September 25th, 1846.	s.	d.	AVERAGES from the corresponding Gazette in the last year, Friday, September 26th, 1845.	s.	d.
WHEAT...............	51	3	WHEAT	52	6
BARLEY	36	1	BARLEY	30	9
OATS	23	7	OATS	21	7
RYE	33	0	RYE	32	8
BEANS	41	6	BEANS	42	5
PEAS	40	5	PEAS	37	0

IMPERIAL AVERAGES.

Week ending	Wheat.		Barley.		Oats.		Rye.		Beans.		Peas.	
August 15th.......	45	1	27	3	23	3	30	7	39	6	36	0
22nd.......	45	11	27	5	23	3	30	10	39	9	36	9
29th	47	10	29	1	23	0	31	10	39	9	38	6
Sept. 5th	49	0	31	0	23	2	32	7	40	4	37	1
12th	50	0	33	7	23	5	32	4	40	11	38	10
19th	51	3	36	1	23	7	33	0	41	6	40	5
Aggregate average of the six weeks which regulates the duty.	48	2	30	9	23	4	31	10	40	4	37	11
Duties payable in London till Wednesday next inclusive, and at the Outports till the arrival of the mail of that day from London . .	9	0	2	6	1	6	2	6	2	6	2	6
Do. on grain from British possessions out of Europe	1	0	1	0	1	0	1	0	1	0	1	0

STOCK OF GRAIN IN BOND IN LONDON

SEPTEMBER 5.

Wheat.	Barley.	Oats.	Beans.	Peas.	Maize.	Flour.
qrs.	qrs.	qrs.	qrs.	qrs.	qrs.	cwts.
14,512	25,627	43,979	39,510	8,991	2,851	20,806

IN THE KINGDOM.

Wheat.	Barley.	Oats.	Beans.	Peas.	Maize.	Flour.
47,626	49,141	61,838	76,253	19,606	6,474	68,585

Account shewing the Quantities of Corn, Pulse, and Flour imported into the United Kingdom, in the month ended the 5th Sept., 1846; the Quantities upon which Duties have been paid for Home Consumption during the same month, and the Quantities remaining in Warehouse at the close thereof.

Species of Grain.	Quantity imported.			Quantity entered for consumption.			Quantity remaining in warehouse.		
	qrs.	bush.		qrs.	bush.		qrs.	bush.	
Wheat, from British Possessions	13018	6		12288	5		2985	1	
Barley, do.	—			—			—		
Oats, do.	—			—			—		
Peas, from do.	967	4		967	4		526	3	
Wheat, foreign	82768	7		42140	0		44641	0	
Barley, do.	26239	5		10012	4		49141	3	
Oats, do.	165052	5		159159	3		61838	1	
Rye	628	0		575	0		57	0	
Peas, do.	11360	4		5611	7		19079	6	
Beans, do.	25110	1		11044	5		76253	4	
Indian Corn, do.	71047	5		73868	6		6474	5	
Buck Wheat, do.	8	6		8	6		207	1	
	cwts.	qrs.	lbs.	cwts.	qrs.	lbs.	cwts.	qrs.	lbs.
Flour from British Possessions...............	170775	3	6	172176	2	9	14947	3	18
Flour, foreign	106607	2	18	60356	3	26	53637	2	24

Maize or Indian Corn imported into Ireland on account of Government, 1,514 qrs. 2 bush.

PRICES OF SEEDS.

SEPTEMBER 28.

Rapeseed, 22*l*. 24*l*. Irish, —*l*. —*l*.
Linseed, Baltic, 40 45 Odessa, 45 47
Mustard, per bush., white 8 10 brown, 9 10
Linseed Cakes, English 11*l*. 10s. 12*l*. per 1000
Linseed, English, sowing 50 60 crushing 43 45 per cwt.
Carraway, 41 43 new, 42 44 Coriander, 10 13
Hempseed, 35 38 per qr. Trefoil, 17 19
Canary, 52 55 fine, 56 58 Tares, winter, 5s. 6d. 5s. 9d.

HOP MARKETS.

BOROUGH, MONDAY, Sept. 28.

The market for Hops has to-day been quiet, as the supplies still come forward freely. Prices remain about the same as last given under this head, and the duty is laid at full 200,000*l*.

WOOL MARKETS.

SEPTEMBER 28.

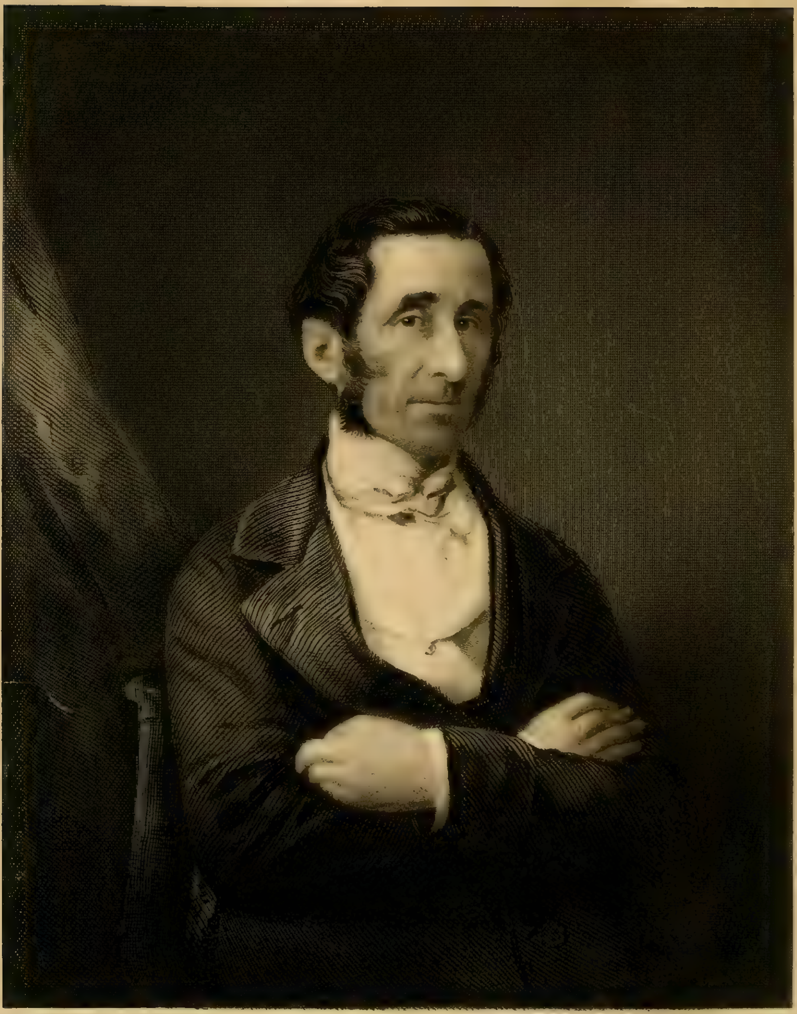
LEEDS, Sept. 25.—Sales of combing and clothing wools are limited to a supply of the current requirements of the manufacturers, who do not buy freely. We do not quote any alteration in prices.

WAKEFIELD, Sept. 25.—There continues to hang a heaviness over the wool trade; but it does not affect prices, which have been steady for some weeks past. The impracticability of buying from the grower to meet late and present rates here prevents any pressure on the markets, and sustains prices, which, under these circumstances, would be enhanced by any favourable move in the trade.

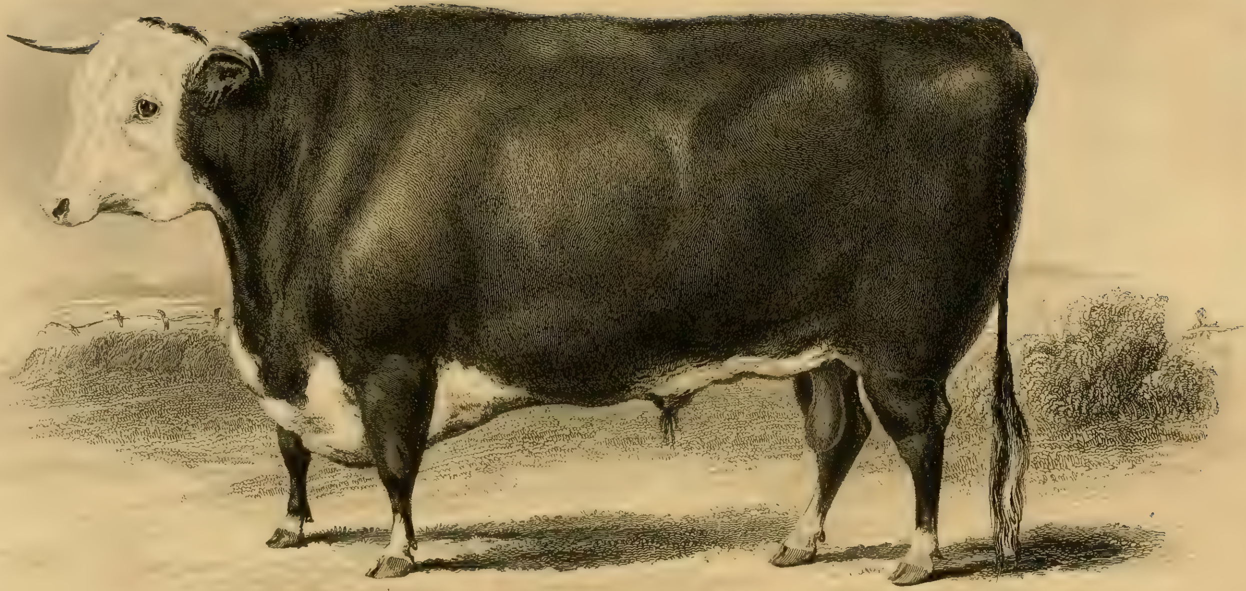
LIVERPOOL, SEPT. 26.

SCOTCH.—We have no better demand to report for Laid Highland Wool, and as the stocks accumulate, orders for quantity could no doubt be executed on rather better terms. White Highland still in limited demand. There has been a few trifling sales in the best class of Cross and Cheviot Wool, at late rates: anything inferior quite neglected.

Printed by Joseph Rogerson, 24, Norfolk Street, Strand, London.



Palmerston



THE FARMER'S MAGAZINE.

NOVEMBER, 1846.

No. 5.—Vol. XIV.] [Second Series.

PLATE I.

PORTRAIT OF THE RIGHT HONORABLE LORD PORTMAN,

LATE PRESIDENT OF THE ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

ENGRAVED BY J. B. HUNT, FROM A PHOTOGRAPH BY BEARD.

PLATE II.

A HEREFORD BULL

Bred by and the property of Edmund Gough, Esq., of Gravel Hill, near Shrewsbury, for which the first prize of Forty Sovereigns was awarded at the meeting of the Royal Agricultural Society of England at Newcastle, July 1846.

THE RIGHT HONORABLE LORD PORTMAN.

When private worth adds its lustre to public station, when the natural talent of the man is recognized as readily as his lawful title, and when, in short, innate excellence is the companion of formal precedence, it is difficult but to anticipate the most signal success. Such an union of power and principle can scarcely fail to carry an effect with it that neither one nor the other could individually ever hope to attain; for, whereas the spirit of might alone would seek in vain for our sympathy, the right of poor genius, if standing equally unassociated, could have but little chance of a more profitable career. To do any lasting good the two should be taught to act and depend, as the eye and the arm of the human frame, each on the other; and so have the strength of the one ready to accomplish that its fellow may have the perception to originate. Examples of this happy combination are perhaps not of so frequent an occurrence as they ought to be. As some say, the very consciousness of being able to *do* will occasionally create a carelessness as to attempting it; while it may certainly be argued with more apparent cause, that the unnoticed efforts of mere promise should sink in the hopeless struggle for attention. These "modern instances," then, we must admit as few, still we have luckily some left in whom energy would seem rather increased than abated by the influence they enjoy, with whom mental advancement stands as the acknowledged superior over their deservedly proud position before the world, and whose great public services are but the reflection of their more circumscribed or daily duties. Men in whose every act the same high purpose and ability are observable, and amongst whom we shall at once proceed to claim a forward place for the subject of our present sketch, the last, and undoubtedly one of the best presidents the Royal Agricultural Society has had the good fortune to obtain.

In this, an age so peculiarly prone to cheapen the value of hereditary honours, it may not be out of place to commence with the fact of Lord Portman having fought his own way to the Upper House, though beyond this the *novus homo* feature cannot proceed. The Portmans, of Bryanston, Dorsetshire, and of Orchard Portman, Somersetshire, are in every respect an ancient family; and the distinction the now representative of it holds is a tribute (letting alone his individual recommendations) that the standing and character of his house have of themselves long merited. So far back as the first of our Edwards do we trace it as distinguished in and conferring benefits on those counties with which it is still intimately connected —lord chief justices, baronets, knights of the bath, founders of priories, and other well-earned dignities of this description, being the stepping-stones that conduct us through the long line of pedigree. The Berkeleys, again, of Berkeley and Stratton, a noble race, whose name from marriage and the right of succession has for many reigns been associated with that of Portman, enjoy an historical fame and rank that require little more than a passing allusion here. In saying even that, we afford proof amply sufficient of the renown and purity of the new peerage, while we are enabled to couple with this good words and works respecting the peer himself, which may be considered of perhaps still greater value.

Edward Berkley, first Baron Portman, was born on the 9th of July, 1799, and sent into something very like public life in a few years afterwards. This "first step" was his entry at Eton, from whence in due time he proceeded to Oxford, as a Christ Church man. In this character Mr. Portman appears to have quickly become no mean proficient in all the varied attainments that not unusually distinguish the members of that celebrated college. Amongst other things which we should certainly be inclined to put down in his favour, we hear of him as an active and efficient one in "the eleven" at Bullingdon (the cricketing ground); a good rider to hounds, and as he has ever since continued to be, a zealous admirer of all field sports.* His University accomplishments, however, did not end here, but had to share his time and attention with a very steady and successful study of the classics—a division of labour and pleasure so happily arranged as to finish off his academical course with that highest honour—a first class degree. Comment on this could be but superfluous, and we can only add that we look upon the college life and times of Mr. Portman as a perfect model for any young man of family and fortune, about to enter on the same scene. The *utile dulci* tempers all his pursuits, and so brings him to the close of a season that it must be ever afterwards to his credit and gratification to recall.

In 1823—a very short time after his quitting the University—we find Mr. Portman in parliament, having been unanimously called upon to succeed his father in the representation of Dorsetshire. The latter for many years had been the chosen champion of the liberties of the yeomen and forty-shilling freeholders—a post of honour he held up to his decease, which took place at Rome, whither he had repaired with his family. Notwithstanding his unavoidable absence at the time of nomination, the son was at once determined on as the new member, and as such continued until the first general election after the passing of the Reform Bill. On that occasion he was called upon, by a most signal majority of the electors, to undertake the arduous duty of representing the newly enfranchised borough of Marylebone. These two, the interests of either being entrusted to him on such very flattering and favourable terms, are the only places for which Mr. Portman ever sat, as in the last year of the reign of his Majesty William the Fourth he was created a baron of the United Kingdom—Baron Portman of Orchard-Portman; and in 1839 was appointed Lord-Lieutenant and Custos Rotulorum of the county of Somerset. Still later his lordship has been honoured with the appointment of an unpaid member of the Council for managing the estates belonging to the Duchy of Cornwall, as also with a similar post in that for the Duchy of Lancaster.

The opinions which during all this period distinguished our senator, alike as a lord and a commoner, have been those of a steady reformer and consistent supporter of civil and religious liberty. All his sayings and doings show this, while many of the bills which he has conducted through Parliament, such as that for consolidating the Friendly Societies Acts, the Highway Acts, and others of that class, though perhaps not creating any great sensation at the time, have all worked on profitably, and with a direct tendency to establish those amendments for which they were intended. In directing any public business of this nature, Lord Portman has always appeared to advantage, being a good and fluent speaker, clear and logical in his argument, well versed in the different phases of his subject, and, above all, possessing in discussion the most happy and unruffled temper. Qualifications like these must tell; and Lord Portman, consequently, never rises without attention, and seldom pleads without effect.

Having thus given an outline of Lord Portman's services for the public in general—services but too often interrupted by severe illness, and always injurious to a frame particularly delicate—it becomes our duty to consider, perhaps rather more carefully, his lordship's labours on behalf of agriculture. The simple fact of his being so large a landed proprietor would, of itself, certainly give him some claim to the character of a practical man, as well as true friend to the interests of the soil. But the right to be thus enrolled does not rest on any so indefinite a foundation. Lord Portman holds, and chiefly manages himself, a large farm at Bryanstone, where he is continually engaged in experiments in agriculture, though anything but prone to decide hastily on their results. Amongst the chief of these at present to be proved, are some trials in subsoiling and stall-feeding; for fully testing the latter of which, the Bryanstoneyard is unusually well provided. Lord Portman's energy in improvement, however, has taken a still greater and still more laudable aim than either of these, in, as we are most happy to say, a highly successful endeavour to reclaim waste lands. The progress of this truly national undertaking has been ably reported in the "Journal of the Royal Agricultural Society," while the reward of its enterprising originator is to be seen on the spot itself, now occupied and well cultivated by a most respectable tenant. An attempt of his lordship's, with the same view, is in operation on a clay district under the Black-down Hills, in West Somerset; a tract where there is evidently room and hopes for improvement, but on which no farmers of capital, science, or general experience have yet been located. Still it must not be supposed that while all this industry and attention are bestowed on the inferior portion of the Portman estates, the more favourably-situated parts are forgotten: plantations judiciously distributed in masses, where they may tell most effectively, speak the owner's forethought on the one hand, while the destruction of heavy hedgerows and all timber injuring the arable land, mark his consideration on the other. In fact, Lord Portman, as a landowner, has done everything for his estates that any man, with a proper pride and pleasure in them, well could. He has, indeed, an eye far beyond any petty or private advantage in improvements of this character; as witness the great labour he volunteered, the great public benefit he accomplished, and the great private loss he must have sustained in obtaining the enclosure of that immense waste, the Roche Forest. As sole lord of it, he not only consented to sacrifice his individual claim, but was the very first to propose it, and so converted that barren tract into a fertile plain, in, undoubtedly, the purest spirit of true patriotism. A right-worthy companion to this, was his lordship's procuring the disfranchisement of Cranbourne Chase; an act that afforded infinite relief to a large number of Dorsetshire yeomen. By right of this—one, we believe, of the old "Royal Chases"—Lord Rivers enjoyed the privilege of breeding and feeding an unlimited number of deer, much, of course, to the injury of all lands in cultivation within the boundaries of the chase. Mainly through Lord Portman's efforts and arrangements an Act of Parliament was passed which, while it provided due compensation for that family to whom the royal boon had originally been granted, gave a proper independence and Englishman's security to the greater part of the county.

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* Lord Portman was for many years a master of hounds, and one of the most popular that ever showed at a meet or shone in a run. Ill-health alone induced him to give them up.

Thus far, and Lord Portman would appear, for the most part, as a friend to, and model for, the landowner; though, as we shall proceed to show, his energies have been quite as much employed for the occupiers. Many years since, he was anxious to impress on them the value of taking their farms on fairly-drawn leases; an advantage which is at length meeting with that appreciation his lordship at that time found it so difficult to obtain. He has still, however, in supporting the recommendations of a long lease, always declared against that wretched system of tenure by leases on lives, and has done much in his own neighbourhood towards its abolition. The great liberality and judicious system on which he is managing his estate in reference to future improvements, are proofs no less of a desire to furnish, than of a knowledge of that assistance requisite to enable his tenantry to meet the competition of the world. To do this effectually, his lordship feels that not only must they be heartily encouraged, but properly protected; and in furtherance of this object he is now asking that justice for the whole body he has ever been so ready to dispense to his own tenantry. Who, then, so fit to press the claim of compensation to "tenants' for improvement" as he who has himself been so strenuous in that improvement? or who so worthy to become the farmers' champion on those really imfeeling towards them? The steps taken by his lordship to attain this object are, doubtless, well known to most of our readers. The bill "To amend the law relating to Landlord and Tenant" has, it is true, failed to obtain that attention from the Legislature which its importance demands; but the soundness of the principle of "securing Compensation to Tenants who shall make Permanent Improvements on the Lands they occupy," must eventually ensure success.

With all this individual quickness in proposing, and perseverance in pursuing, anything which promises to benefit the interests of agriculture, it was not likely but that Lord Portman would at once perceive the advantage to be derived from a

General Agricultural Society, and lend his influence to establish it. We find him, accordingly, one of the earliest life governors of the Royal Agricultural Society, and in due course, succeeding to the president's chair. Fortunately, many who read this have had the opportunity of observing Lord Portman's conduct as president, so that they can acquit us of any exaggeration or unbecoming expression of praise in our endeavours to do justice to it. Those qualities we have already alluded to as of such material assistance to the mere public speaker, have, as naturally, equal or more weight and effect in the chairman. That fine command of temper, and conciliatory courtesy, coupled still with a business-like firmness and impartial tone, are nearly certain to obtain that general approbation they so deservedly merit. Thus it was with his lordship's year of office; commenced and continued in the same affable and proper spirit, he has left a character with the Society that any yet to come will find it hard indeed to excel. With one and all we believe this to be the same opinion, and we record it as an estimate rarely founded on a better reason.

Strings of strong fact and golden opinions like these, whilst they at once establish the eminence of the agriculturist, still leave the character of the country-gentleman scarcely complete. After all this proof of good example to the landlord and zealous advocacy for the tenant, the picture must surely have looked unfinished had we forgotten Lord Portman's many and well-applied bounties to the poor. Here, in the third estate, we see the same fine feeling equally active; the same good genius that devised ornament for the park and advancement for the farm, adding comfort and convenience to the poor man's home. The same voice that urged the farmer on, giving heart and hope to the farmer's men—the same Lord Portman, in a word, whose happy influence we have already traced so far. In this sphere we need but name the foundation of free schools—*free* in the right sense of that term, for all sects without favour or distinction; of clothing, and other benefit clubs, started, of course, and mainly supported by, his lordship; and of his setting apart large portions of land for "allotment tenants;" all, be it observed, framed on the principle of inculcating self-reliance, at the same time they afford grateful assistance. We need only, we repeat, mention these few more acts of judgment and generosity so successfully blended, to convey the full impression of a great and good man.

And here, we believe, our notice must close. Had we to follow the subject of it into private life, those many amiable attributes we have had occasion to refer to, could but render our theme one of most inviting description. On ground, however, so proverbially sacred in the eyes of our countrymen, we proceed no further than saying, Lord Portman married, in 1827, the Lady Emma Lascelles, third daughter of the late Earl of Harewood, and that he has a family of four sons and two daughters. To all those purest of joys and sweetest of sympathies a family circle afford, we must now leave his lordship, conscious that few could naturally be more fitted for them, or have laboured more earnestly to extend the blessings they depend on.

ON THE USE OF CHARCOAL AS A FERTILIZER.—EMPLOYMENT FOR THE IRISH LABOURER.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

It is always instructive to examine the generally slow progress by which any agricultural improvement is accomplished, a new manure established in the farmer's list, or a new agricultural practice or implement introduced. The remark well applies to the use of charcoal as a fertilizer; and we need hardly feel surprised at this, when we remember that the charcoal of commerce, as commonly obtained by the slow and only partial combustion of small forest wood, is generally too valuable for other purposes, to be employed by the farmer as a dressing for his land. It is true that in many places the charcoal of peat may be obtained at a sufficiently reasonable rate; but the farmers who formerly dwelt in the neighbourhood of the great fens and bogs of the United Kingdom were, perhaps, but little acquainted with the distinction between the charcoal of peat and turf, and the *ashes*, or mere earthy or saline matters remaining after the complete combustion of those substances had taken place. I propose in this paper to examine this difference, and the mode, as far as our present chemical knowledge extends, in which the charcoal so beneficially operates upon vegetation; and I do this with the hope that the preparation of turf charcoal may, at this period of distress and scarcity of food, afford very considerable and profitable labour to the unemployed Irish poor.

The distinction between charring peat and burning it to an ash was pointed out 250 years since, by one of the earliest of the English Agricultural writers; and considering the limited chemical knowledge of his days, he did not—as far, at least, as the presence and operation of the two salts (sulphate of lime and phosphate of lime) of peat ashes are concerned—arrive at a very wide approach to the truth in his explanation of the cause of their fertilizing effects.

"Ashes," says Worlidge, who wrote in 1697 (*Mysterie of Husbandrie,* 72) "contain in them very much of a rich and fertile salt—the wood ashes are the best, and very useful. Turf and peat ashes must needs be very rich, being much after the same manner as the burning of land."

Worlidge, however, was far from being the first who noticed the use of charcoal and wood ashes. Cato recommends the burning of the twigs and branches of trees, and spreading them on the land. This appears to have been an ancient practice in Lombardy, for in 1570 Conradus Heresbachius, in his treatise on *Husbandrie,* translated by Googe, tells us (p. 20) that "in Lombardie they like so well the use of ashes, as they esteem it farre above any doung."

From the days of Worlidge down to the end of the seventeenth century, hardly an agricultural writer appeared who did not to some extent or other advocate the use of charcoal as a dressing for land.

In April, 1783, Arthur Young commenced a series of experiments, not only with charcoal, but with sulphuric acid, and a variety of other substances as manures. The experimental researches of this celebrated agriculturist were much too commonly conducted on so small a scale, as materially to detract from their value; but still, notwithstanding this drawback to their practical use, yet the very numerous trials dispersed throughout the early volumes of his Annals of Agriculture, abound with proofs of the sagacious reasoning and love of truth which distinguished Arthur Young. The trials with charcoal are given in the Annals, p. 139 of vol. 1. It is needless to closely follow these garden-pot experiments; the conclusions, however, at p. 149, observed Young, were that "charcoal contains something that assists vegetation for a time considerably. To what then is the benefit owing? Are we to consider charcoal as a body not differing from wood ashes? This trial, combined with the results of others, will not allow such a conclusion, for I have found those ashes to *act in proportion to the goodness of the soil*; to do little good on poor land, but we find the effect of charcoal considerable for a time." Again he adds, p. 153—"charcoal alone has done good in one instance from first to last." When we arrive at p. 162, Young adds, with his usual love of accurate detail and truth, when speaking of one of his series of experimental pots:—"A carpenter letting a piece of timber fall on the pots, while putting up a bench, broke some, and tumbled the rest over; here, therfore, ends this trial." He seemed, indeed, ever to feel, as he remarked on another occasion (ibid 188) that "the man who wants this sort of candour is fit only for voluntary ignorance."

In 1826 a very excellent volume upon Peat, Moss, or Turf-bog, appeared by Mr. Andrew Steele, of Crosswoodhill. He says, p. 33:—"Firm peat is very easily charred by smothered combustion, even in an ordinary fire-grate, as is generally done in Holland, where its charcoal is commonly used in winter for burning in small pots for the purpose of keeping the feet warm. We are informed by Mr. Headrick, that some of the Scotch Highlanders convert large quantities of black peat into charcoal, which the smiths use in their forges; and he thinks this species of fuel is better adapted for the reduction of metal, and the making of bar iron, than even charcoal of wood." When speaking of the various modes of preparing peat charcoal, Mr. Steele adds (p. 357):—"Two methods have been followed in these trials—the one by exposing the peat to a smothering heat, as is practised in the making of charcoal from wood; the other by exposing it to a heat in close vessels or furnaces, and thus subjecting it to a kind of distillation."

A few months since, Mr. C. E. Rogers drew the attention of the public to the importance of turf or peat charcoal as a manure, and as affording abundance of remunerative employment to the unemployed poor of Ireland. After this publication, the Royal Agricultural Society of England offered a premium of twenty sovereigns for the best essay on peat charcoal as a manure.* And within the last month Mr. Rogers has published another work on the same important subject, and especially on the value of turf charcoal to the iron manufacturers, which I recommend to the early notice of the Irish landowners and farmers. In this work he adds his testimony to the value of turf charcoal as a fertilizer, and attributes its powerful influence, as a manure, to its powers (amongst other good properties) of absorbing the excretory matters which plants deposit in the soil.*

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* Twenty Sovereigns, or a Piece of Plate of that value, will be given for the best Essay on Peat Charcoal as a manure for Turnips and other crops.

Competitors will be required to attend to the following points:—

1. Quality of peat.
2. Mode of making the heaps and burning the charcoal.
3. Quantity produced from a given measure of peat.
4. Quantity applied per acre, and effect, in comparison with peat ashes, and with some other manures.

N.B. This Essay need not be sent in before the 1st of December, 1846.

The chemical operation of charcoal, when employed for this purpose, is by no means, however, so well understood as that of most other fertilizing additions to the land. That plants derive their supply of carbon from those gases, such as the carbonic acid gas, of which carbon forms the base, is not only the opinion of Liebig and Johnston, but of all the enlightened chemists of our day. That the carbon of the charcoal operates so beneficially upon plants, amongst other modes by a gradual combination with oxygen, hardly admits of a doubt. Liebig gives the results of a series of experiments by Lukas, on the use of charcoal as a manure, which seem to corroborate this opinion. From the facts which these chemists, however, adduce, it is evident that the beneficial action of charcoal, as a fertiliser, depends upon the presence of other substances besides carbon. Liebig notes (*Organic Chem. p.* 62) that "plants thrive in powdered charcoal, and may be brought to blossom, and bear fruit, *if* exposed to the influence of the rain and the atmosphere. Plants do not, however, attain maturity under ordinary circumstances, in charcoal powder, when they are moistened with *pure distilled water* instead of rain or river water. Rain-water must therefore contain within it one of the essentials of vegetable life; and it will be shown that this is the presence of a compound containing nitrogen: the exclusion of which entirely deprives humus and charcoal of their influence upon vegetation." It is ammonia, to whose presence in rain water Professor Liebig thus refers, in whose valuable work (p. 207) the experiments of Lukas will be found. From these we learn that in a division of a low hothouse, in the Botanical Garden at Munich, a bed was set apart for young tropical plants; but instead of being filled with tan as is usually the case, it was filled with powdered charcoal, the large pieces of charcoal having been previously separated by means of a sieve. The heat was conducted by means of a tube of white iron into a hollow space in this bed, and distributed a gentle warmth, sufficient to have caused tan to enter into a state of fermentation. The plants placed in this bed of charcoal quickly vegetated and acquired a healthy appearance. As always is the case in such beds, the roots of many of the plants penetrated through the holes in the bottom of the pots, and then spread themselves out; but these plants evidently surpassed in vigour and general luxuriance plants grown in the common way, for example in tan."

M. Lukas there gives a cut of several of the exotic plants upon which charcoal appears to have produced the most beneficial effects. It appeared also to promote the rapid germination of seeds. He then proceeded to try the effects of charcoal when mixed with vegetable mould, all of which answered very well. "The charcoal," continues M. Lukas, "used in these experiments was the dust-like powder of charcoal from firs and pines. *It was found to have most effect when allowed to lie during the winter exposed to the action of the air.* In order to ascertain the effects of different kinds of charcoal, experiments were also made upon that obtained from the hard woods and peat, and also upon animal charcoal; although I foresaw the probability that none of them could answer so well as that of pinewood, both on account of its porosity and the ease with which it is decomposed. The action of charcoal consists primarily in its preserving the parts of plants with which it is in contact, whether they be roots, branches, leaves, &c., unchanged in their vital power for a long space of time, so that the plant obtains time to develop the organs for its further support and propagation. There can scarcely be a doubt also that the charcoal undergoes decomposition, for after being used five or six years it becomes a coaly earth. It exercises likewise a favourable influence by absorbing and decomposing the matters excreted by the roots of plants, so as to keep the soil free from the putrefying substances, which are often the cause of the death of the *spongiolæ*." "Every experiment," concludes Mr. Lukas, "was crowned with success, although plants belonging to a great many different families were subjected to trial" (*ibid. p.* 211).

Professor J. F. Johnston (*Elem. of Ag. Chem. p.* 142) recognises the good properties of charcoal as "a valuable mixture with liquid manure, night soil, farm-yard manure, ammoniacal liquor, or other rich applications to the soil. It is even capable itself of yielding *slow* supplies of nourishment to plants; and it is said in many cases, even when unmixed, to be used with advantage as a top dressing. In moist charcoal the seeds of the gardener are found to sprout with remarkable quickness and certainty, but after they have sprouted they do not continue to grow well in charcoal alone. Drilled in with the seed, charcoal powder is said greatly to promote the growth of wheat."

As it is of great importance that the farmer should understand the difference between turf and peat *charcoal*, and the *ashes* of these substances, I will here repeat what I have elsewhere had recently occasion to remark on the subject (*Bell's Messenger*, 1846, *p.* 318) :—

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* Letter to the Landlords and Ratepayers of Ireland; detailing means for the permanent and profitable employment of the peasantry without ultimate cost to the land or the nation, and within the provisions of the Act 10 Vict., c. 107. By Jaspar W. Rogers, C. E. London,: J. Ridgway.

The distinction is very easy to understand; for the first kind, the *peat ashes,* like those of Holland or of Berkshire (owing to the mode adopted of merely burning them in uncovered heaps in the open air), contain hardly anything but the earthy and saline contents of the peat. To give an analysis, 100 parts of some Dutch ashes were examined, and were found to be composed of—

Siliceous earth . . .	32
Sulphate of lime (gypsum) .	12
Sulphate and muriate of soda, Glauber salt, and common salt . .	6
Carbonate of lime (chalk). .	40
Oxide of iron . . .	3
Loss during the analysis . .	7
	100

These ashes being totally devoid of carbon (or charcoal) are evidently adapted for the only purpose to which the Dutch farmers apply them, viz., as a top-dressing for their clover or other grasses into which the gypsnm of the peat ashes enters as an essential constituent. The charcoal being all removed by the combustion of the peat, it is evident that for crops which do not contain sulphate of lime the peat ashes could hardly be expected to be a fertilizing application. But let us examine carefully the analysis of the ashes procured from peat by a different and far less complete combustion of the carbon of the peat and turf. Such an analysis we find in the excellent little work of Professor J. F. Johnston ("Elements of Agric. Chem.," p. 189). The ashes were obtained from Paisley moss by Mr. Fleming, of Barrochan. One hundred parts of each of these contained—

	White Peat Ashes.	Black Peat Ashes.
Charcoal . . .	54.12	3.02
Sulphate and carbonate of potash, soda, and magnesia	6.57	5.16
Alumina . . .	2.99	2.48
Oxide of iron . .	4.61	18.66
Sulphate of lime . .	10.49	21.23
Carbonate of lime .	8.54	3.50
Phosphate of lime .	0.90	0.40
Siliceous matter . .	10.88	4.391
	99.10	98.36

From this analysis it will be seen that the first, or white peat ashes, were so prepared (by merely checking the extent of the burning) that they contained more than half their weight of charcoal. It is to the preparation of this kind of impure *charcoal* ashes that I am now so anxious to direct the immediate attention of the owners of those estates, in whatever portion of the United Kingdom they are situated, where suitable turf abounds, and work is difficult to obtain. I hardly deem it necessary to prove to any one the value of charcoal as a valuable manure; and if it was necessary to obviate the suspicion that there is any difference in the effect produced by the use of charcoal ashes and the impure variety of these ashes afforded by peat, I am readily supplied with the means of doing so by a recent report by Mr. Peter Mackenzie, of West Plean, near Stirling ("Quar. Jour. of Agric., 1846," p. 467). He tells us that he has been for some years past trying experiments with peat, *charred* peat, and peat ashes, as a substitute for stable manure, and for many kinds of crop grown by farmers and gardeners. He remarks, "In the spring of last year, I collected a quantity of peat for various purposes, and part of it was intended to be charred or burned. It was not so well prepared for burning as I wished, a good deal of moisture being in it; however, a good fire was made of wood to begin with, and as the peat dried it was drawn to the fire, and in this way was kept burning for two weeks. It required little watching, only once or twice in twelve hours. The partially dried peat was drawn to the fire, because it was intended to have a quantity of *charred* peat and ashes mixed together, and in order to obtain both, the fire was kept in a smothered state to *char* the peat (let the farmer mark the distinction). It commonly burst through in some parts, and there supplied the ashes. When we had a quantity to begin with, the unburnt peat and the charred, with the ashes, were all well mixed together; at least one-half of the mass was unburnt peat." This mixture was applied about the beginning of May, to a light sandy soil, for a crop of Swedish turnips. The quantity used was at least at the rate of 200 bushels per acre. "We tried it," continues Mr. Mackenzie, "against well-made stable-manure in a state like mould, cut well with the spade, which was applied at the rate of about 20 tons to the acre, and spread into drills, like the peaty mixture. The plants grew well in both cases. We tried to ascertain the amount of produce per acre from each manure, as late as the middle of January, 1846; for, from the mildness of the season, the turnips till then appeared to be in a growing state, each plant having had about two square feet of surface to grow upon. The surface was kept flat, and the ground chiefly worked with the Dutch hoe. The weight of bulbs fit for use manured with the peaty mixture was upwards of 40 tons per acre; while those produced from stable-dung weighed only about 30 tons. One row of peas was also manured with the peaty composition, and yielded as great a crop as those manured with the stable-manure." Sush a preparation of charcoal, although mixed with other substances, the farmer will find very valuable in a variety of ways. It would constitute an excellent foundation for dung heaps or sheep-folds, since charcoal very extensively absorbs the gaseous matters of putrefaction, and when used in considerable proportions, would also imbibe all the drainage matters of the sheep, or other live stock. It answers as well, also, for a *covering* for dunghills; but to this end, again let me remind the farmer, that he must only *carbonise* or *char* his peat or turf; he must, to accomplish this, by covering the burning heap with earth or green turf, retard, regulate, and reduce the extent of the combustion as much as possible. It is to the presence of a considerable portion of carbon in the ashes of land pared and burnt, that the advantages of this now nearly exploded operation may be attributed. The ashes of a pared and burnt chalk soil from Kent contained four to five per cent. of carbon, that of a light Leicestershire soil contained six per cent., and that of a stiff clay soil from Mount's Bay, in Cornwall, contained eight per cent. of carbon.

The evidence, then, is abundant in favour of charcoal as a fertilizer. At such a period as this, too, when starvation appears to threaten, if it has not already visited, a large portion of the population of Ireland, it seems a most opportune and desirable period for the extensive and immediate preparation of charcoal from the abounding bogs of the sister kingdom. Let, then, the attempt be promptly made: let every owner of bog or peat land make some effort in this way; and in so doing, such real friends of their country may rely that they will thus not only serve very materially their at present unwillingly idle neighbours without burthening themselves, but that they will moreover enrich their own estates, while they promote the comfort and the improved cultivation of the land of their birth.

THEORY AND PRACTICAL USE OF LIME.

BY J. TOWERS.

My attention has been drawn to these subjects by the perusal of Professor Daubeny's paper "read at the Chemical Section of the British Association, on Friday, September 11, 1846," as it is reported in the *Pharmaceutical Times* of the 26th *idem*. There are passages in that paper which can be profitably referred to as strictly true in themselves, as bearing upon the uses of lime in husbandry, and particularly as connected with its operation upon humus, and its availability in reclaiming waste bog, or peat lands.

Dr. Daubeny observed that he had "selected a topic which some may regard as almost exhausted; for all who have consulted the recent treatise of Professor Johnston on Agricultural Chemistry will admit that he has communicated in it a very able and correct account of the uses of lime in agriculture."

With deference to such authority, and under the disadvantage of not having seen the treatise alluded to, I may still be permitted to observe that so far from the subject being exhausted, I conceive that few philosophers, and not one among a hundred of practical farmers, have even formed a correct notion of the essentially specific agency of lime upon inert vegetable matter; and that, until Mr. Rowlandson, of Liverpool, wrote his truly valuable articles upon liming, the world was ignorant of its peculiar corrective powers. That which Sir H. Davy taught about thirty-six years ago remained, and, generally speaking, still remains in full force as an accredited theory. In his seventh Agricultural Lecture, speaking of limestone, chalks, marls, and other carbonates of lime, as compared with hot or quick-lime, he says:—"It is obvious that the operation of these substances depends upon principles altogether different." "Quick-lime renders matter which was comparatively inert nutritive; and as charcoal and oxygen abound in all vegetable matters, it becomes at the same time converted into carbonate of lime. It tends to bring any hard vegetable matter into a state of more rapid decomposition and solution, so as to render it a proper food for plants." Again—"When lime, freshly burnt or slaked, is mixed with any moist vegetable matter, there is a strong action between the lime and the vegetable matter, and they form a kind of compost together, of which a part is usually soluble in water."

This view of the action of hot lime might rationally suggest itself to the mind of a philosophic chemist forty years since, and being promulgated at a period when agricultural chemistry commanded neither respect nor attention, by an authority so exalted, the few who thought on the subject at all might naturally seize and embrace as conclusive.

I entertained no other notion myself about the time that Liebig's first work appeared: I only, with others, endeavoured to show that in order to decompose surplus or crude vegetable matter, and liberate its elements, lime must not only attract the moisture, or free water of the herbage, but must disturb the chemical affinities of the elements which compose its tissue, so as to liberate the hydrogen and oxygen, causing them to re-combine as water, and to deposit the carbon in the form of black charcoal; in a word, that it must produce chemical combustion—without ignition indeed, but nevertheless true in its results.

But while the theory, so far as it went, may be certain, we must premise that the lime so to act must be pure and unslaked, or in that very condition wherein we find it when it absorbs and combines with water, in the act of slaking; otherwise it can never burn and consume the vegetable matters, even if applied to the extent of from four to eight hundred bushels per acre. Independently, therefore, of its mere destructive power, pure lime, that is to say, lime free from carbonic acid, whether fresh from the kiln, or slaked by air or water (*i. e.* in the condition of hydrate), must and does exert a chemical action peculiarly specific, and of vast importance to the agriculturist; and this I shall endeavour to render experimentally evident, after quoting one leading passage from the paper of Dr. Daubeny. It reads thus—

"Its effect in rendering the organic matters more soluble, or rather, as I should prefer to represent it, in promoting their decomposition so as to render them better adapted for supplying both carbon and nitrogen to growing plants, has been already sufficiently explained by Professor Johnston and by others. Yet when we recollect that quick-lime, mixed with pounded granite, speedily liberates the contained alkali, and that many of the clays and claystones which compose the bulk of several rock formations in secondary and tertiary districts are derived from granitic rocks, we cannot doubt that the action of quick-lime upon the latter will be of analogous description."

These qualities of lime, that is to say, its solvent power, and that of liberating potash from rocks and clays, are very important; but they have little or no reference to the one which appears to be still more extraordinary.

Some years since, the theory of *humus* was broached; and for a time the cultivators of the ground were taught to consider it the all-in-all—the pabulum of nutrition—"the chief nourisher in life's feast:" or, in other and more homely terms, "the cooked food of plants." Soon, however, the zeal of its partizans was checked, and then it appeared that humus was a slowly formed product of vegetable decay; and that, so far from being a wholesome food, its predominance became a medium of barrenness and destruction. Peat bogs, flow-mosses, and, indeed, all submerged masses of vegetable matter, abound with humus; and these, so long as they remain in their natural condition, are worthless, and unproductive of good cerial or garden crops. Lime, duly applied in tillage, is the grand chemical remedy; it exerts a specific action not at all connected with any solvent power, and this has been clearly and unequivocally explained by Mr. Rowlandson of Liverpool. He has entered into a minute chemical detail of facts, and has shown by irresistible evidence that his theory of the remedial action of quick-lime is correct. Mr. Ruffin, of the United States, had paved the way for new researches into the agency of calcareous manures, and his able articles were copied in the pages of the British Farmers' Magazine of 1835.

Since the appearance of Rowlandson's article I entered into several interesting experiments, a detail of which will substantiate the view taken by that gentleman of the chemical action of lime.

There are two or three substances which fairly represent humus. The first is, the dark-coloured mass that remains after long-protracted fermentation of the dung mixen, and long after it has attained the state of what is termed 'spit-dung.' The second, the dark brown remains of the bottom of a very old wood pile. The third, completely reduced leaf-mould, or that peculiar modification of moor-soil which is occasionally found in some heath commons. All these substances can be procured for experiment, and will furnish proof of the singular agency which lime must exert upon vegetable remains when reduced to the condition of humus.

If to a solution of caustic potash, soda—and particularly of ammonia—a portion of either of the aforenamed matters be added, much colouring matter will be extracted, conferring a deep brown tint to the solution. Water alone, when heated to the boiling point, will extract a little of this colour, but to a comparatively trifling extent. From these facts, and by observing that the alkali employed loses causticity and some of its acrid taste, chemists have concluded that humus contains an acid principle, to which the modern term 'humic acid' has been applied; and if we admit that a combining power between alkalies and other substances in an opposite state of electricity is sufficient to establish the presence of an acid, we will not dispute the correctness of the term.

But if, in lieu of any of these pure alkalies, lime be employed, whether in powder or as strong lime-water, colour will be destroyed, and the supernatant liquid will become very pale. Thus, for example:—Take an ounce of any of the three substances named; mix with it a quarter of its weight of powdered quick-lime, and pour on the mass a pint of boiling rain-water. After stirring to effectually blend the whole, let the mixture repose for a time. At first the floating liquor will be turbid, but it will finally become clear, and nearly void of colour.

This experiment may justly be considered inconclusive, for the effect of the lime might be deemed negative. However, having prepared any of, or all the brown liquids, that is to say, the soluble humate of *potassa* of *soda* and of *ammonia*, take a known measure of any one of these, more or less, and add to it either a small quantity of lime in powder, or so much strong lime-water as shall be required to produce the effect, which will speedily become sufficiently evident. In either case a precipitate will be produced, and the liquid will be nearly deprived of colour.

Here we perceive a positive or direct action of the lime, for it becomes evident that its affinity for the humic extractive or acid is so strong as to take it from its alkaline base, whether that base has been potash, soda, or ammonia.

The same phenomena will occur if common heath soil, bog, or turbary peat-moss be the subject of experiment. Mr. Rowlandson announced these results in the "Journal of Agriculture," and I can vouch, by the evidence of repeated experiments, that his conclusions are faithful, so far at least as they can be attested by solutions of any of the humous substances obtainable in farm or horticultural establishments. Further confirmation may be obtained by testing that dark-coloured liquid from farm dunghills, which, throughout the kingdom, is so laudably and economically squandered by our sons of the soil. If lime be added to it in any form, the same precipitate will occur, with considerable reduction of colour; and thus we are enabled to sum up the qualities of quick-lime in the space of a few lines.

1. If applied to green vegetables, quite hot from the kiln, it will destroy the tissue and carbonize the substance, itself being brought into the state of mild lime or chalk.

2. As powdered or air-slaked lime, it will directly kill slugs and moluscous vermin, acting by its peculiar attraction for water.

3. As an alkali it will neutralize acids of every description, and hence is peculiarly useful if dusted over trees infested with lichens.

4. Its affinity for humic acid is predominant, as we have seen; and, therefore, it becomes a specific remedy, wherever there is a redundance of inert decayed vegetable remains.

5. According to high chemical authority, it is capable to liberate potassa from clay and granitic rocks, and to set it at liberty from its combination with flint as an insoluble silicate of potassa.

6. It is a mistake to suppose that quick-lime renders vegetable and animal remains soluble. These substances are partially soluble, as we have seen in the three alkalies; but the precipitate formed by the addition of lime is not soluble, or, at any rate, it is so far fixed that it will remain long quiescent in the ground, from which it can only be taken up in very small quantities and by slow degrees, according to the capacity of the vegetable for such food.

Lime, then, acts as an antidote of redundant humous matter, attracting and fixing its acid, as an innocuous humate; and thus, upon the above principles, I hope that I have not only established unequivocally the importance of lime as a prime agent and corrective, but have in a degree "relieved the bewilderment" of "A Constant Reader" who, at page 325, under "Agricultural Queries," solicited some information "On the Properties of Lime."

ON THE CULTIVATION OF WHEAT.

BY M. M. M.

The operations of the farmer are, to a certain extent, to overcome the tendencies of nature. There is, indeed, a disposition manifested throughout all her arrangements, to give to every atom of space a large amount of vitality and enjoyment; and from the rich alluvial meadow, which contains hundreds of plants in one single square foot of its surface, to the bleak and sterile rock, covered with its lichens, there is not a particle of space which is not occupied.

Plants are indigenous or exotic. The indigenous plants are often those which the farmer dreads; and their determination to occupy his soil is his chief annoyance; while the tender or difficult exotic is what he mainly wishes to foster and cultivate; and hence his endeavours to clear the soil of weeds, and to plant and cultivate and nourish his crop.

But beyond this the cultivator has to improve the plants, to select the finest specimens, to watch their dispositions and capabilities, and improve their character, until they cease to be what they once were so completely, as to be undistinguishable successors of their progenitors.

In nothing are these observations more fully realized than in the cultivation of wheat. Naturally the product of an eastern and arid clime, it has spread over the civilized world, and alike exposed to a torrid summer or a frigid winter, it has become the staple of existence of probably four-fifths of the inhabitants of the world.

Its character since its first notice seems to have changed. In the Divine records we are told of "seven ears" coming up "in one stalk, full and good ;"[*] and this appears to account readily for that and the adjoining countries, bringing forth such tremendous produce as "an hundred fold," or at the rate of two bushels seed per acre—a produce of twenty-five quarters to the acre !

Now, however, we never see more than one ear spring from one stalk ; our climate seems to have the unaccountable tendency to diminish the number of ears to one, while in Egypt six or seven ears are no uncommon occurrence. The wheat plant appears to possess a wonderful power of reproduction under favourable circumstances ; and the capability to form ears out of stems seems in this country to be developed in producing stems from one root. The writer has in his possession at this moment a root of wheat of the creeping red variety, which was given to him by Colonel H. Croft, of Stillington, in Yorkshire, which has seventy-two stems from it, full and vigorous as is possible to conceive. It is another extraordinary property of the wheat plant that it possesses, polypi-like, the power of being subdivided in an almost infinite degree. Mr. Lance, of Lewisham, obtained by transplantation in some roots 40 to 50 stems with ears from six to seven inches long, and in one instance obtained actually the extraordinary number of 190 ears. Mr. Miller, of Cambridge, produced from one grain of corn 3¾ pecks, or nearly one bushel. Mr. Fulla, of Newcastle, in an experiment on sowing wheat, gives the following comparative results :—

				bush.	
No. 1	transplanted into	6	inch lines	62½	per acre.
2	„	9	„	56¾	„
3	„	12	„	61	„
4	drilled „	12	„	65¾	„
5	broadcast			58	„

The above are given by no means as advocating or recommending the practice. It is evidently illusory as regards a farmer attempting it ; and doubtless the situation was such when the trials were made, as no farmer could possibly have, except perhaps on the remains of a celery or cucumber bed ; but it proves the amazing capabilities of the wheat plant to reproduce its kind, with a degree of fecundity equalled only by its utility to mankind.

It must not be thought from these observations that the wheat plant is one easy to cultivate ; for, though it thrives in a stiff soil, it may be too hard ; though it will grow in a loose sand if properly attended to, it is easily thrown out ; though it thrives in a hot summer, it may be burnt up for want of moisture ; and though wet is injurious to it, it still requires, at certain seasons, considerable moisture. Indeed, it may be said to require a medium of soil, condition, and climate, to be brought to full perfection. If the soil be too poor it is short and sickly, and acts almost as if it nursed the weeds beneath it ; if it be too rich, it lodges or mildews ; and no plant requires the watchful eye of the cultivator more carefully or more assiduously.

Twenty years ago it was believed that wheat could only be cultivated on strong retentive clay soils, and that it luxuriated best on the "two crop and fallow land ;" and hence our cold and stubborn clays have been growing triennial wheat crops almost since the very first moment of their cultivation. An open fallow, limed and manured each alternate year, seemed to be the acme and the desideratum of all wheat culture.

The clays of Cleveland, and Buckinghamshire, and Cambridgeshire, were considered the only legitimate soils for wheat ; and while lighter soils were spurned and neglected, the strong clays were the desirable and fashionable soils. The four-course system of farming, however, completely reversed the order. It established the fact that while its clover root was a better bed for wheat than a fallow, the sheep's treading and droppings were a much better dressing than lime or manure ; and that blowing sand could, in eight or even four years, be adapted to the production of as many bushels of wheat to the acre as the naked, open, laborious fallow ; and with this difference, that on the latter there were the accumulation of two years' rent, tithe, taxes, and labour ; on the former there was a stock of sheep to sell, and no labour beyond the ploughing and sowing. Hence, as the four-course system of husbandry gained ground, the wheat displaced the rye, and the crops were so encouraging and good, that the wheat became one of the most profitable crops. Taking an ordinary run of 25s. per acre land, the produce might be 5 qrs. of barley after turnips, and 30 bush. of wheat ; and the value of each would be something like this, at the prices of the last eight or ten years :—

	£	s.	d.
5 qrs. of barley at 32s. per qr........	8	0	0
30 bush. of wheat at 6s. per bush.	9	0	0
Extra value of produce	1	0	0
Extra cost of seed wheat over barley ..	0	6	0
Net value per acre of wheat over barley.	0	14	0

Hence wheat is attempted on nearly all light soils as well as on strong ; and though in the former there is a greater danger of its being thrown out in the spring by the lightening of the soil by winter frosts, still the danger of excessive moisture is almost an equal injury on strong retentive soils; and to counterbalance this, the one has been growing wheat for several centuries, until the free elements of that plant in the soil are considerably exhausted; whereas the light soil has not for years probably grown a blade of wheat. Connected with this part of the subject, and with the soil and manure calculated for wheat, is the analysis. The corn and straw are given—

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[*] Gen. ch. xli., v. 22.

	Wheat corn.	Wheat straw. Lbs. in 100,000
Potash	225	20
Soda	240	29
Lime	96	240
Magnesia	69	32
Alumina	26	90
	Oxide iron	90
Silica	400	2870
Sulphuric acid	50	37
Phosphoric acid	400	170
Chlorine*	10	30

From the above it will be seen that the principal ingredient in wheat of a fixed character is phosphorus; and when it is considered how much of that material is drained from the soil year after year, and sold off the farm, it is not surprising that we hear clay-soil farmers complain of "old going land" and "spent soil;" and land having lost its "freshness." The drain of Sicily of its corn so impoverished the soil of its phosphorus as to reduce it almost to sterility. The blowing sand which had been growing rye containing but 0.46 per cent. of phosphorus, and oats containing but 0.7, had left a sufficient quantity; and the sheep droppings and the bone manure at once left consolidation sufficient for the root, and suitable manure for the plant. Hence good farmers, in all parts of the kingdom, have come to the unanimous conclusion that no soil is too light to grow thriving crops of wheat, if only it be properly tilled.

It would be useless to go over the broadcast sowing and pole harrowing—the gripping and the water-furrowing of wet undrained clays—nor to follow the various processes of ploughing, dragging, rolling, and harrowing of open summer fallows—for thick or very strong soils they may be occasionally necessary, and may be once in half a century useful even on light ones. The process is too mechanical—too familiar and too odious to bring before our agriculturists in print.

Assuming therefore the soil to be convertible—to be growing crops alternately green and grey, and that the wheat is placed at the end of the rotation, in some of the following places :—

Turnips.	Turnips.	Turnips.
Barley.	Barley.	Barley.
Clover.	Seeds.	Beans.
Wheat.	Seeds.	Wheat.
	Wheat.	

The first process is the ploughing, which can be accomplished in any weather not too dry. For such is the consolidating power of the *trifolia* that the very lightest soils will sometimes become so hard as to defy the power even of a Ransome, a Barrett, or a Howard's plough to penetrate.

The system of sowing broadcast in the plough seam has nearly disappeared. The liability of the seed to be lost in the interstices of the furrows; the difficulty of covering the grain, and its liability to be left hollow below, and to be thrown out by the frosts of winter, as well as the danger of the seed being devoured by birds when so exposed, have all tended to diminish the sowing of the seed in the plough seam. The operation of ploughing finished, the roller and the harrows are put into immediate operation, and the surface reduced to a level, when the ribbing plough or drill are used as preparatives for the seed. Ribbing was the first process which followed the sowing in the plough seam; and the reason for it was, that the surface might be consolidated, and a firm seed-bed secured; and then the ribbing plough displaced a portion of the surface soil, in little furrows, five to seven inches wide, which formed a drill for the wheat, supplied a cover, and admitted of the action of the hoe between. Two acres per day could be prepared in this manner; and being sown broadcast afterwards, the seed fell into the furrows exposed. Since this process another step has been taken; and the practice of pressing has been introduced both as consolidating and expediting the work. Two or three ploughs, as the case may be, are followed by a pressing machine, which by its weight compresses the interstices between such furrow slice, and rams it down flat upon the subsoil; the seed is then sown, and the whole harrowed. This seems all that the light-land farmer could desire. The operation is performed as rapidly as the ploughs can turn over the surface; and, as no other operation is necessary, the sower may follow as rapidly as possible, and the whole operation be completed at once. A firm seed-bed and a loose top are secured; and the only strange part of the operation appears to be, that in pressed crops, on the shallowest and lightest soils, there is often very great disappointment, How is this? The writer (one season daily) passed a field, half of which was drilled and half pressed. All autumn the pressed was superior; but in the spring the drilled took the lead, and had more produce at harvest by six to ten bushels per acre. The course can be explained by the following sketch :—

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* Sprengal, Jour. Roy. Ag. Soc.

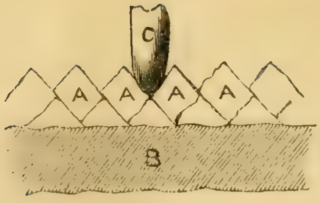


Fig. 1.

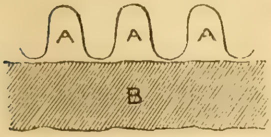
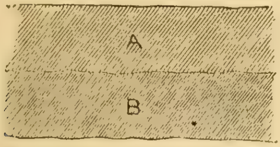


Fig. 2.

Here A represents the surface or manured soil; B the poor or subsoil; C the presser; from which it will be seen that the presser crushes that part of the land where there is the least soil to carry down with it, and by its lateral pressure does in reality carry down scarcely any soil whatever; and thus the land is left as in Fig. 2, with the seed reposing nearly on the barren subsoil. The roots of wheat will, if in a favourable soil, travel downwards to an almost incredible length. The Rev. John Monson, of Bedale, in Yorkshire, who encourages spade husbandry, has detected their descending as low as there was an open fertile soil; and in a situation where there had been pits of potatoes detected them six to seven feet long, owing to the subsoil being pervious and rich. In the case of pressing in the seam as above, there is no good soil in which the wheat can extend its roots; and hence so much disappointment in pressed crops. Mr. Short, of Martin, near Bawtry, whose farming altogether is very judicious, in the first instance harrows the surface, and renders the whole level after the land is ploughed. The presser is then laid on across the furrows, and carries down with it its full share of the soil in every case, thus:—



Fig, 3.

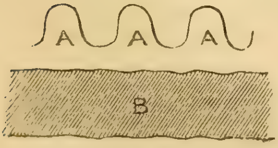


Fig. 4.

Fig. 3 represents the surface as harrowed, and Fig 4 the land pressed, with a fair proportion of consolidated surface soil, in which to have the seed deposited.

Much has lately been said in advocacy of dibbling and thin sowing. Mr. Hewitt Davies and Mr. Mechi have much advocated the process; and many persons have followed the process with various results. In gardens, 70, 80, and even 90 stems have been produced from a single ear; and if the soil were in a condition *much too rich for any crop,* the plan might succeed. But in ordinary farming—in the very best of farming, where *profit* was an object, and not fancy, it has seldom been pursued. In allotments it has been successful: it has saved seed, and produced well; but we know, from distinct instances, on different soils, within twenty miles of the place where we are now writing, where it has so signally failed that no inducement, short of compensation for the loss of a crop, could induce them to again attempt it. That a struggle will be made in these times, when economy is so necessary, to adopt it is certain; but it is equally certain that it must end in a failure. We are in possession of a series of experiments which have been made, and the results brought to the test of the bushel, and the scale which shows the dibbling system a perfect failure, and which at a future opportunity we shall give.

The drill is the sheet anchor of wheat sowing. The seed is deposited with the accuracy and regularity of clockwork: the quantity can be regulated to a fraction—a peck per acre; the rows are straight, parallel, and regular; the depth can be adjusted to a trifle; and the whole apparatus adapted to the necessities, capabilities, and circumstances of soil and season, with a mere loosening of a screw, or the turning of a handle. Hornsby, Groundsell, Garrett, and various other manufacturers' drills, are as perfect both for mechanism and practical effects, as a chronometer or a steam-engine. There is not, perhaps, a more beautiful sight than an accurately-drilled patch of wheat; and when, on the farms of such cultivators as the Messrs. Outhwaite, of Bainessee, in Yorkshire, a twenty-acre field is drilled with an accuracy that scarcely a variation of an inch from a straight line occurs in the whole piece. It might almost call forth the exclamation which Sir John Sinclair is said to have made at the first specimen of drilled corn he saw at Holkham—"What a beautiful piece of lavender!"

Before the wheat is sown, however, it is necessary to prepare it. Several steeps have been recommended, the object of which is to prevent the destructive effects of that frightful disease the smut. Various recipes have been recommended by different writers, comprising every nostrum, from blue vitriol to chamber-lye; some recommending steeps, some washings; some, other methods.

Without at present entering into any statement of opinions as to the cause of the disease, or reviewing, seriatim, the different appliances relied on for a remedy, it may not be amiss to state that the following process has never failed the writer, nor his predecessor, on a farm which, before their adoption of it, the smut was insufferable :—

Take to every bushel of corn one ounce of arsenic, and dissolve in one pint of water, adding half a pound of salt. Spread the corn on a level floor, and pour the liquor on the wheat, continually stirring it until the whole is wetted, or rather damped thoroughly. Then apply and mix quick-lime with the corn until it is sufficiently dry to sow; and we will guarantee that not an ear of smut will be visible. When first used, chamber-lye was used instead of water, but after several years' trial of water instead, the disgusting application was dispensed with. The seed is also secure from crows and vermin; and the arsenic, so destructive to animal life, seems to have no effect of an injurious tendency on the seed wheat.

The effect of arsenic in preventing the ravages of vermin is extraordinary. A piece of spring wheat was sown immediately before a storm which lasted several weeks, and when it subsided, the field seemed to be an attraction to all the crows in the county, and they threatened its utter destruction. The owner, vowing vengeance on the marauders, boiled a quantity of wheat in a very powerful saturated solution of arsenic, and sowed it over the surface of the field, expecting to see his black enemies reduced in number, when, strange to say, next morning, although they came as usual, not one could be induced to alight, even on the field, and they sat in the trees around with a sort of moody melancholy, as if they were afraid to come within the arena of the deadly poison! The object was, however, amply secured. Whether this proved the powerful olfactory sensitiveness of the birds, or whether it arose from that instructive apprehension of danger which seems, as a guardian angel, to attend and warn both human and brute nature, it is impossible to determine, but it is a fact worth knowing by every cultivator.

Varieties of wheat are now almost innumerable; five years ago the rage was little short of that for the celebrated Dutch tulips or the Share mania of 1845. We remember packets of 50 grains sold for 5s., which were both coarse and unproductive, and the Whittington, golden drops, and every other kind seem fast to be giving way again, before the well-tried, old country "creeping red." The varieties are all divisible into red and white, and probably again divisible into spring wheat and autumn wheat. Respecting the two varieties there has been much dispute as to their being distinct, and no botanist can say they are so; but one will endure a winter which will destroy the other; and one will ripen in a period, weeks shorter than its competitor. The difference is one of *habit* rather than of *nature*; and is an instance of that strange adaptation observable in all nature, of animals, plants, and even parts of organized beings accommodating themselves to peculiarities which necessity or habit induced. A person accustomed to doses of laudanum can take as much as will poison a parish; a medicine taken daily ceases to exert its power, because the system accommodates itself to it. The exotic wheat becomes acclimatised in our temperate regions, just as the Indian elephant or African lion bear exposure to our northern temperature. Wheat sown for a few years in the spring obtains its original rapidity of vegetation and maturity, while sown invariably in the autumn it must accustom itself to its winter adolescence. The wheat season, however, is so far becoming extended from October to May, that the varieties are merged in all possible ways, and so far are lost and annihilated.

But what is the best manure for this staple of human life? We know what it contains, and hence some writers affirm that only to supply these, and keep the land clean, and wheat may be grown *ad infinitum*. Mr. Briggs, of Overton, near Wakefield, has, we believe, carried this into practice to a certain extent; but there may be so many refined and subtle principles and agencies at work, which no analysis can detect, and no artificial means supply, that will probably baffle all our endeavours. Manure applied to wheat in general renders it liable to mildew and disease. Farm-yard manure, nitrates, guano, &c., often produce this, while lime and rape-dust add weight and yield to the corn, but often diminish rather than increase the straw, and never produced mildew.

A very satisfactory experiment on rape-dust was made by Mr. John Outhwaite, of Bainessee, near Catterick, in 1841*, and the particulars of which are as follow:—Soil, strong; subsoil, clay; sown March 19 and 20; partly manured with rape-dust at the rate of 40s. per acre (about 2 qrs. to the acre) the remainder nothing. 2 roods 8 perches of each were selected, and the result was :—

	Sheaves.		Corn in bushels.
Rape-dusted piece	305	..	21½
Nothing	255	..	15½
Difference in favour of rape-dust	50	..	6
Increase per acre	91	..	11

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* *Yorkshire Agricultural Society Trans. No. 3.*

Per centage of increase	20	39

Clear profit, 2*l.* 8s. per acre.

Probably, however, bones are the most natural manure for wheat. The constituents of both are so much alike that it is only a sort of transmutation of the ingredients from the broken-down inanimate portion of the animal into the eleminition of the ramified structure of the vegetable. We could relate many very successful applications of bones for wheat; and Sir Samuel Crompton, who has on a light and naturally poor sand most magnificent crops of wheat, the general fault of which is, that they are only too heavy by the use of bones, which he obtains unadulterated from his own beautiful steam-mill, erected on his farmstead at Wood-end, in Yorkshire.

Perhaps the best and healthiest, as well as most productive, crops of wheat have been obtained after the ground has been prepared for it by a previous crop favourable to wheat. Experience has proved that more successful cultivation attended a crop of seeds, or even a crop of red clover twice mown, than a manured grain stubble, and that beans and turnips preceding the wheat crop appeared to assimilate and prepare the food of wheat better than even a direct application of manure.

The three crops last mentioned seem to be favourable for wheat, while tares, barley, and peas appear prejudicial; but so natural do a crop of turnips appear to be as a percursor of wheat, that the Messrs. Outhwaite, of Bainessee, the most successful cultivators in the North Riding of Yorkshire, and indeed the model farmers of the district, sow their wheat upon their turnip land, and then barley after seeds. The fact has been known since the days of Davy, that spring wheat was more nutritious than autumn wheat; and judging by the analogy of its growth in its native country, it does not seem to require a winter sleep. Still our short summer is not always sufficient to fully mature late sown corn, and so much of it was frosted even in 1845, as to show the experiment to be somewhat precarious. Sir Humphrey Davy's analysis is as follows:—

	Starch.	Gluten.	
Winter wheat	765	190	In 1000.
Spring wheat	700	240	

The latter for azotised matter (gluten) is more on a par with the Sicilian wheat, which grows according to the analysis of the same chemists, 239 parts in 1000 of gluten.

Rolling, hoeing, weeding, reaping, stacking, are too familiar operations to need any description; they are done better or worse in various parts of the country and in different ways, and row culture is very valuable in enabling the farmers to stir the soil and earth up the plants.

The natural enemies of the wheat plant are very numerous; they pervade the vegetable and animal world in every grade, from the undistinguishable fungi to the spreading ash-tree, and from the almost invisible aphis to the gigantic camel. Mildew, rust, smut, agote, wire-worm, wheat fly, weevil, crows, sparrows, &c., are in turn its assailants.

Smut is a decay of the grain in the ear, and the deposit of a black powder in the interior instead of flour. It may be cured by the arsenious wash previous to sowing, described above.

Rust is a brown or yellow powder, which covers the plant in unfavourable seasons, and which is little understood, and perhaps difficult to cure. A top-dressing of nitrate of soda has often revived an unhealthy plant.

Mildew is a more formidable and less curable disease; indeed it is doubtful if any cure short of cutting down can arrest its ravages. The most luxuriant crop seems in the most danger. Fungous granulations rise out of the straw and completely arrest, or poison the sap; red or pink blotches deform the stem, and the entire progress of the crop is arrested. Beyond the cautionary steps recommended before, no remedy can be devised. To review the opinions of writers, as to even its cause, would fill a volume. We put a few opinions in juxta-position:—

Jussieu Duhamel Vanquelin Fourcry Prevosh	Infection.
Darwin Spallangani Dr. Hales	Want of Impregnation.
Linnæus Somerville Walker	Impregnation by an insect.
Davy	Fungus excresence.
Bauer	Morbid swelling.
Dr. Hume	Excess of juices.
Lisle	Want of sap.

Later naturalists and botanists seem to lean to the opinion of Davy, as to its cause; but in such a conflict of opinions who shall decide?

The expenses of cultivating an acre of wheat after clover-ley are very small compared with working a summer-fallow. Appended is a scale of costs adopted by me in valuing tenant-right for a railway in Yorkshire, and which was deducted in calculating the profits of the crop:—

	£.	s.	d.
Ploughing	0	6	0
Sowing	0	3	0
Harrowing	0	1	0
Rolling	0	1	6
Seed	0	18	0
Weeding	0	4	0
Straw for harvesting, and all expenses up to marketing			
	£1	13	6

Bayldon gives it, with wheat at 8s. per bushel, as follows :—

	£.	s.	d.
Ploughing	0	9	0
Seed.....................	1	4	0
Sowing, 6d.; harrowing, 1s. 4d.	0	1	10
Harrowing and rolling	0	8	0
Weeding, 2s.; rolling, 1s......	0	3	0
	£2	5	10

The same authority gives the working of a fallow for a crop 10*l.* 5s.

This strikingly exhibits the value of growing wheat in a green crop rotation rather than as a fallow crop; and also proves how the light and despised sands can, by green crop growing and sheep feeding, purchase a horse before the crops on the fallow system on the clay soil purchase the saddle. Hence, in my professional capacity, the light sand, if red and fertile, which twenty years ago would be worth 25s. per acre, is put at 35s., and the clay, which was considered worth 30s., is put down at 25s.

THE ALLOTMENT SYSTEM.

The following letter, from Captain Scobell, of Kingwell, High Littleton, who has been one of the most successful and persevering advocates of the allotment system, was read at a meeting at Beaminster, held last week, for the purpose of promoting the system of cottage allotments :—

" It is, I assure you, with regret that I find myself unable, from my engagements, to be so long absent as my attendance at Beaminster on Thursday next would occasion.

" I esteem it a duty and a pleasure to use any fitting opportunity of evidencing to others the proved and gratifying tendencies and results of the Field Garden system. My sincere hopes and wishes will be amongst you. Your district seems in earnest—but where there is even but moderate zeal and ordinary benevolence, the voice of a stranger will not be missed for the practical perfecting of such considerate sympathies. We live in days of much *profession* of kindliness to the lowly—in the present case the *practice* is easy. Nothing is asked—nothing should be given as mere charity. In a spirit of justice and good will, permit the poor man to rent a little land for his domestic wants, on the terms of the greater occupier. If the rich man will do this confidently and disinterestedly, he will find that, however extensive his possessions, the small portion so let will vie in self-satisfying feelings with his more expansive transactions. Is it not, then, unwise to allow the virtues of our humbler neighbours to be of stunted growth, when they may thus readily be drawn forth and ripened ? And then, when we remember the higher motive, that God's word is distinct and peremptory as respects our relative and our bounden duties, can any one that is able remain unwilling ? It will not be the fruit of the ground alone that will certify the goodliness of this mutual tie ; but the continuing fruit of the heart, passing onward through the parent to the child, will likewise abound.

" I have not followed out this pleasurable communion with the labouring poor for some fifteen years, without having proved to my own conviction the surest safeguards for its equitable and enduring prosperity. You have been pleased to invite my opinion thus founded, and I will, as I must forego the opportunity of speaking them, record thus a frank epitome of them.

" 1st. There should be no favourites among the tenants, neither exclusion on the onset from previous misdeeds. This is not only a preserving but a reclaiming system.

" 2nd. The tenants should be (except in case of sickness or accident) self-maintaining labourers, and journeymen mechanics : no higher grades, nor permanent paupers.

" 3rd. The land should be of good average quality—they then can uphold it ; and its situation should be convenient.

" 4th. The size of the respective field gardens ought to be from 20 to 40 poles—enough to grow for home consumption, but not enough to make salesmen of the tenants.

" 5th. Above all things the rent should neither *be more nor less* than the proportionate charge to the farmer for similar land—the wholesale price. If it is more, the motive will be suspected ; if less, it will look like money charity, and seem to want permanency.

" 6th. Let the rules for occupation be few and simple —easy to understand, and not likely to be questionable in performance. A tenant should never be displaced but for a *proved* breach of one or more of these rules.

" 7th. A portion (and from the potato failure a large proportion) of the garden should be planted to vegetables *not potatoes*.

" I have now only to express my interest in your exertions around Beaminster, and their results. No landlord nor farmer need doubt or fear ; and the clergy may be full of hope. Cultivation will be good—rent will be duly paid—and, above and beyond all, good characters will be sustained, and faulty ones amended. If in the further progress I can be of any service, it will give me real satisfaction. With my hearty aspirations towards the assembled labourers' friends on Thursday next—I am, dear Sir, your's, very obediently,

" G. T. Scobell.

" H. P. Steele, Esq."

Cattle Insurance.—We understand that his Royal Highness Prince Albert has insured the cattle on the Royal Farms in Windsor Park in the Farmers' and Grazers' Mutual Cattle Insurance Association.—(See advertisement.)

REMARKS ON THE AGRICULTURE OF ABERDEENSHIRE.

BY THOMAS SULLIVAN.

No. VI.

DRAINAGE.

The soil of the greater proportion of Aberdeenshire being incumbent on granite, by the gradual disintegration of which it has been formed, is naturally of very inferior quality. The climate, too, is cold, humid, and exceedingly changeable; and hence it is obvious that the cultivation of wet, retentive lands, cannot, under any system of management, however skilful, be very advantageously prosecuted until relieved of superabundant moisture, by drainage. Being fully sensible of this, the proprietary and tenantry are now, generally speaking, zealously co-operating in all parts of the county, to carry that fundamental improvement into effect—a considerable share of the expense being defrayed by the former, as those most deeply interested in the permanent melioration of the soil. A great extent has been thorough-drained during the last ten years; but a vast deal yet remains to be done; indeed, it is probable that there are few counties (if any) in Scotland that stand so much in need of drainage as Aberdeenshire. In every district, and in all seasons, the injurious effects of redundant moisture upon the soil and crops are more or less apparent. Extensive tracts of arable land still remain in a wretched and unprofitable condition under the influence of superfluous moisture; and, although at present the produce of these, except in very favourable seasons, barely repays the expense of their cultivation (which is generally greatest where the soil is wettest and least productive), yet there is every reason to expect that when properly drained and adequately manured, the cost thereby incurred will be amply repaid.

The husbandry of Aberdeenshire has advanced at an astonishing pace during the last twenty years; and, efficient drainage being justly regarded as the primary step towards developing and increasing the productive capabilities of the soil, that fundamental improvement has been, for some time past, very extensively and vigorously carried on. In order to render my observations on this subject in some degree practically useful. I shall advert—First, to the different methods of draining usually practised in Aberdeenshire; secondly, to the expenses that have actually been incurred in executing the operation on different farms; and, thirdly, to the profits and other beneficial effects that have been found to accrue therefrom. Considering the immense importance of drainage, as conducive to the interests of all classes—landlords, farmers, and the community at large—and as the means of increasing simultaneously the productive powers of the soil and the salubrity of the climate, while affording useful employment to thousands of our labouring population, no apology is deemed necessary for entering somewhat minutely into detail in illustration of each of these heads.

Before proceeding to describe the Aberdeenshire methods of draining, it will be proper to premise a few observations respecting the causes of superabundant moisture, in order to enable the reader to judge of their propriety or impropriety. In a district so much diversified with hill and dale, it is to be expected that the over-wetness arises, in many instances, from water oozing up from beneath the surface in the form of springs, or flowing over the ground from a higher source. Accordingly, numerous springs do occur in all parts of the county, and, when not intercepted before reaching the surface, and conveyed away by a drain of sufficient depth, occasion swamps and morasses of greater or less extent, in proportion to the copiousness of the supply of water. In very many cases over-wetness in land arises from both springs and rain-water which is prevented from percolating downwards by a retentive soil or an impervious substratum; but in the great majority of instances, especially in the low-lying parts of the county, the latter is the sole or predominant cause. Throughout a very considerable portion of Aberdeenshire the active soil is incumbent on a ferruginous incrustation, or "moor-band pan" as it is commonly designated, which is quite impervious to water; and so indurated that the two-horse plough is altogether unable to penetrate it. In other parts of the county, as in the division of Buchan, the soil is of a more or less tenacious character—resting on a sub-stratum of tilly clay—a combination which likewise prevents the free descent of rain-water.

It is obvious, then, that thorough-draining or furrow-draining (as it is indiscriminately termed) and deep tillage are the only means of effectually relieving by far the greater proportion of the wet lands of Aberdeenshire of redundant moisture, and of diminishing the expense, while increasing the profits of their cultivation. Accordingly, the method of draining which has been so prominently brought into public notice by Mr. Smith, and thence denominated the Deanston system, is now very generally practised throughout this county; with such modifications, however, as circumstances render expedient. It is, therefore, to the different modes of executing *thorough-draining* that I purpose adverting in this article; but it may be proper, in the first place, to make a few observations on the deep or transverse drains, which have been so generally superseded by those constructed according to the Deanston system.

In the "Agricultural Survey of Aberdeenshire" it is stated that Dr. Anderson had not only executed a number of drains on his farm at Monkshill, but that he had *publicly* recommended the *tapping* of wet ground before Mr. Elkington's practice was known. It also appears that the Elkington system was practised to a considerable extent shortly after that once popular method of draining was brought into public notice. Dr. Skene Keith mentions that many of the landed proprietors had employed Johnston, a disciple of Elkington, to survey not only their personal farms, but also those of several of their tenants, for the purpose of obtaining directions from him regarding the best method of removing the superabundant moisture which they had found from experience to be most prejudicial to their crops. As the over-wetness arose, in many instances, from water issuing to the surface, in consequence of meeting with some interruption in its subterranean course, the Elkington system was found highly beneficial. In those days it was deemed unnecessary to drain any except springy or spouty land; and it was seldom that the whole of a field was drained, but merely the spots which it was dangerous to allow the working cattle at any season to walk over. When a spouty patch was to be dried, a large drain or trench was formed of sufficient depth to reach the channel or bed along which the water filtered before encountering the obstruction which had forced it to the surface; and so directed as to intercept as many springs as possible. It was found that one drain skilfully placed, and of sufficient depth, frequently rendered a large tract of wet land perfectly dry and firm. Though not now practised to anything like the same extent as formerly, this method of draining is still adopted in most cases where the wetness proceeds from one or more springs, as in bogs and swamps. The drains are cut from five to seven, and occasionally nine feet in depth, and most generally filled with stones, to within two-and-a-half or two feet of the surface; but they are also not unfrequently left open in bogs, and other situations where the cartage of stones would be difficult, if not altogether impracticable, until the ground has acquired some degree of solidity after the removal of the water with which it was surcharged.

As superfluous moisture (in hilly lands in particular) often arises from both causes associated, namely, springs and (recent) rain-water; so both systems of draining, viz., the Elkington and the Deanston, are frequently combined with the greatest advantage. Although the latter popular method is beyond question the most applicable to the greater proportion of the wet arable land in this and other parts of the country, yet experience has fully proved that it cannot, in all cases, be practised with equal benefit or economy, and abundantly shown the impropriety of altogether abandoning the system of deep draining, as has been done in most districts throughout the kingdom. Drains cut to the usual depth of furrow-draining will always more or less mitigate the evil in the case of wetness proceeding from springs; but it is manifest that they cannot remove the cause, as they are too shallow to reach and intercept the current of water. Both remedies are, in reality, applicable to very different cases; and, consequently, neither of them can with propriety be substituted for the other, though both may be, and, indeed, have been practised in conjunction with the most beneficial results where both sources of wetness exist.

A kind of drain which was formerly much employed, and is still frequently constructed in particular cases, is made in the following manner:—A trench of about twenty-four inches in width at the top, from sixteen to nineteen inches at the bottom, and of such depth as the nature and texture of the subsoil and other circumstances may render necessary in order to obtain a secure foundation, on which the stones may firmly rest, is cut through the field to be drained in such a direction as is considered best calculated for carrying off the water. After the bottom of the drain has been made quite even, and all loose soil cleared out, two rows of medium-sized stones, set obliquely, and leaning to each other at the top, like the roofing of a house, are carefully laid for the passage of water. If the drain be narrow, and the stones employed are of a tolerable size, the whole of the water passes through between these two rows; but if the stones be small, and a large flow of water is expected, there are two, and sometimes three, rows of these couples, with a flat stone between every two rows, which, together, will void a considerable stream. A quantity of small stones collected off the fields is then thrown promiscuously above these, until the top of the drain is within sixteen or eighteen inches of the surface of the ground. The stones being rendered uniform on the top, are covered either with heath or turf cut from the adjacent land, if the field is in grass; after which a sufficient quantity of the earth thrown out in excavating the drain, is returned, and the rest scattered over the ground. This description of drain is sometimes employed as a "leader" for receiving and conveying away water from smaller drains; and by using pretty large-sized stones for couples, a copious stream will be voided by a drain so constructed. It is also well adapted for conducting water from springs, is easily formed, and will continue in efficient operation for an indefinite period, provided proper care is taken in its construction.

As has been already observed, *thorough*-draining is that which is now most generally practised in Aberdeenshire; and in all parts of the county the operation is being extensively and vigorously carried on. All agriculturists are unanimous as regards the necessity and utility of drainage; but in reference to the manner in which particular parts of the process ought to be be executed, considerable diversity of opinion still prevails among practical men. The most proper depth of the drains with a due regard to economy, the most suitable size of stones for filling, and the manner of putting them in, are the chief points that now remain unsettled. In the following pages I shall endeavour to place before the readers of the "Farmer's Magazine" a brief account of the main features of the modes adopted by some of the most intelligent agriculturists in Aberdeenshire.

Every farmer being sensible of the immense utility of efficient drainage, not only as the basis of all subsequent improvements on the soil, but also in most instances the source of immediate and lasting remuneration, as well as the means of materially diminishing the expense of cultivating the land, while increasing its productive powers, one of the first particulars that engages the attention of a candidate for a vacant farm, in making his inspection of the grounds, is, the condition of the soil with respect to moisture. Should draining be considered necessary in any field or part of the farm (which it most generally is, to a greater or less extent), an arrangement between the proprietor and the offering tenant, specifying the allowance to be given to the latter for executing that improvement, is agreed to previous to the bargain being concluded and a formal lease drawn up.* In such cases the operation is, of course, begun immediately after entering into possession of the farm, and prosecuted with all possible expedition during the first five or six years thereafter, in order that the maximum advantage may be secured therefrom before the expiration of the lease.

Draining is carried on during every season of the year, and at all stages of the rotation; but the winter and early spring months are those in which the operation is most generally accomplished. Drains are occasionally executed while the land is in stubble, and also in some instances after the removal of the turnip-crop from the ground just previous to ploughing it up for the sowing of grain. It is, however, during the period in which a field is in grass, and immediately before breaking it up for oats, that most farmers in this quarter prefer to drain it, for the following, among other reasons; viz., that the stones employed in filling are then carted to the drains with less difficulty and labour to the horses, and less injury to the land; and that they can be broken and filled in more cleanly and expeditiously than when the ground is soft and loose on the surface; besides, when the field is in grass at the time of draining, suitable turf can very conveniently be obtained for covering the stones previous to putting in the earth.

Main-drains.—In beginning to drain a field or piece of land, the situation, direction, and dimensions of the main-drains or leaders first demand the careful consideration of the farmer. Their number and position are of course regulated in a great degree by the nature of the surface; and their dimensions are determined chiefly by the extent of land whence they are intended to receive water, the degree of wetness, and other obvious circumstances. They are invariably made several inches deeper than the small or parallel drains, for the purpose of affording the water a sufficient fall from the latter, and thereby preventing the accumulation of sediment at the junction of the drains with their leader, which, it is obvious, would soon render them partially inoperative. Main-drains, constructed in the manner to be presently described, are generally from three to three-and-a-half feet in depth, from fifteen to eighteen inches in width at the bottom, and a proportionate breadth at the top. The depth just mentioned is considered quite sufficient for main-drains, when the branch ones that fall into them are only from thirty to thirty-three inches deep; but, of course, the depth of the former must be increased in proportion to that of the latter. It is hardly necessary to state that the main drains are always opened before the cutting of the smaller ones that are to be led into them is commenced, but that the latter are generally filled in before the former, the propriety and object of which must be known to every reader. The following is the usual mode of constructing main-drains:—After the cutting and filling of the whole of the smaller drains are completed, and it has been observed that a sufficient and uniform fall is secured for the water both into and from the main drain, a low wall is built with flat stones at each side of the bottom of the latter; openings being, of course, left at the proper places for the parallel drains to enter. Their height is commonly nine inches, the distance apart about seven inches; and they are surmounted by strong flag-stones or "covers;" any interstices between which are carefully filled up with small stones to prevent the entrance of earthy matters. There is thus formed a conduit or "eye" as it is here designated, of seven inches in width by nine in height, which is capable of voiding a considerable body of water. When the subsoil is composed of sand, or is in any degree soft, the bottom of the main-drain is generally paved with round stones, previous to the formation of the little side walls of the conduit, with the view of insuring the permanency of the work. Indeed, many intelligent agriculturists are of opinion that whatever may be the texture of the subsoil, the bottom of all mains should be so paved, as however firm and secure it may be at the time, there is some reason to apprehend that the continual abrasion of the water would eventually undermine the sides or otherwise endanger the safety of the drain. No doubt the cost is thereby increased; but, in the opinion of many skilful drainers, it is an exceedingly false economy to construct main-drains in an imperfect or insecure manner, for the sake of saving a trifle of the expense. Efficiency and durability are the great points to be aimed at in their formation; and the judicious farmer will not hesitate to incur a little additional expense, in order to secure these desirable qualities; especially when aided, as he always should be, by his landlord. There are various other sorts of main-drains besides that just described; but, as neither of them is so much approved of as it, it is deemed unnecessary to occupy valuable space with any further remarks on this part of our subject.

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* The different arrangements entered into by landlords and tenants in Aberdeenshire, for executing the operation of draining, have already been adverted to under the head "Connection between Landlord and Tenant," in the "Farmer's Magazine" for June last.

Common drains.—The parallel or common drains are invariably made in the direction of the greatest ascent or slope of the ground, except where it is considered the declivity is so great that the velocity acquired by the water in descending would be likely to produce an injurious effect; in which case it is supposed by some to be necessary to direct them with a slight inclination across the slope, in order to diminish the force of the current of water in the drain. But it is, perhaps, needless to observe that such situations rarely stand in need of thorough-draining, at least not in such a degree as the low, and almost flat grounds, which it is the farmer's first care to relieve of redundant moisture.

The *intervals* at which the drains are placed in the field vary from seventeen to thirty feet, according to the texture of the soil and subsoil. In the division of Buchan, which contains a greater proportion of clay than any other part of the county, it is, in many cases, found necessary, for effecting complete and efficient drainage, to have them so close to each other as seventeen or eighteen feet. When the ridges are seventeen feet in width, it is the common practice to form a drain in each of the inter-furrows. In the other divisions of the county, however, the soil is not in general of a very adhesive character, and drains from twenty to thirty feet apart are found quite adequate to effect the object in view. They are often, but not invariably, made in the furrows; the proper direction and distance asunder being objects of greater importance.

Dimensions.—The dimensions of furrow-drains are in a great degree regulated by the kind of material intended to be employed in filling, and also by the manner of forming the channel for the passage of water. Stones are almost exclusively used for this purpose throughout Aberdeenshire; and there are two methods of putting them into the drains. Many farmers, agreeably to the Deanston plan, break the stones to a small size, like those used in repairing the public roads; and put them promiscuously in to a certain depth. Several others, however, are of opinion that each drain should be furnished with an "eye" or open conduit in the bottom, similar to, but of smaller dimensions than, that of the main-drains already described. Each of these modes of filling, and the cases in which the last-mentioned one becomes preferable to the other, shall be adverted to in a subsequent part of this paper. When it is intended to form an "eye" or opening in the bottom of the drain of three inches in width by four in height, which are the usual dimensions, the drain requires to be about eighteen inches wide at the top, and twelve at the bottom; but when broken stones are to be used, without a conduit in the bottom, the drains are formed so narrow as barely to afford room for the labourers to work with freedom. In this case the width at the top is generally fifteen inches, and that of the bottom five.

Much difference of opinion exists among farmers in regard to the most proper depth of drains. There seems, however, to be a general and an increasing disposition to practise somewhat deeper draining than has hitherto been considered necessary or advisable. The usual depth of furrow-drains at present is thirty-two inches; until very recently a depth of thirty inches was the most common and the most generally approved of in Aberdeenshire; but the opinion is fast gaining ground among intelligent agriculturists that by cutting the drains from six to twelve inches deeper their efficiency in drying the soil would be very materially augmented; and that, therefore, the distance between them may be proportionably increased. When the subsoil plough is intended to be afterwards used, the minimum depth to which stone drains are cut is thirty-two inches below the surface of the ground. Both these important operations, viz., draining and subsoiling, are deemed by many experienced farmers in this district to be necessary accompaniments to each other; for, when either is left undone, the maximum advantage cannot be derived from the accomplishment of the other.*

Cutting.—The situation, direction, and dimensions of the drains having been determined on, their formation is next proceeded with, beginning, as already mentioned, with the opening of the leaders. It is very customary for farmers to enter into an agreement with one or more skilful workmen, called *contractors,* for executing the cutting and filling of the drains at a stipulated rate of wages per hundred yards; and this is found to be a convenient and useful practice, as one or two men are thus rendered responsible for the work of the others. But as the filling-in, especially when stones are the material employed, is justly regarded as the part of the process that demands the greatest care and attention in its performance, many farmers contract only for the opening or *casting* of the drains, preferring to have the remainder of the work accomplished by the regular or constantly employed farm-servants, or by labourers hired and paid by the day. These, having no interest in hurrying over the operation, and being under the immediate superintendence of the farmer or his steward, are more likely to execute it in a perfect and substantial manner than men engaged at piece-work. Regular specifications, stating the dimensions of the drains and other particulars, are drawn up for the guidance of the contractor, who is usually bound to complete the operation within a limited period, and engages workmen accordingly.

It is considered unnecessary to occupy space by describing at any length the manner of opening the drains, as there can be but little peculiarity in the mode of performing this part of the process. I shall, therefore, merely remark that the farmers, in general, are particularly solicitous that the drains, besides being of the specified dimensions, shall be straight and even along the bottom, that a sufficient and uniform fall be secured for the water, and that the sides be regularly and similarly sloped. Previous to the filling-in being commenced, or the contractor being paid for the cutting, all the drains are individually inspected by the farmer or his steward, in order to be satisfied that all parts of the work have been correctly executed, agreeably to the previous arrangement. Most of the landlords (all of whom in Aberdeenshire defray a considerable proportion of the expense of draining) have a man specially for the purpose of examining the drains in course of formation on their respective estates, and seeing that they are constructed in a correct and substantial manner. It is, perhaps, needless to observe in this place that in every case the opening of the drains is commenced at the lower, and the filling at the higher level, in order that any water which may happen to be present, may thus be permitted to escape, which not only insures a dry footing for the labourers, but also serves to indicate any defects in the work already accomplished.

Should the land about to be drained be in grass at the time, the work is usually begun by stretching a line in the proper direction, and marking off with a spade the breadth of the drain at the top. The surface sods are then dug out, and placed on one side; and in some instances they are cut with care, in order that they may subsequently be available for covering the stones before returning the earth. The tools employed in draining are two different sizes of spades, a pickaxe, a footpick, and a narrow shovel or scoop for throwing out the loose earth from the bottom of the drain. The footpick or "tramp-pick," as it is likewise termed, is a most effective instrument for breaking up the indurated subsoil, through which the spade alone could not easily be made to penetrate; as, also, for loosening any stones that may be met with.

Filling.—It has been already mentioned that stones are the material almost exclusively employed throughout Aberdeenshire for filling drains; and there are but few parts of the county in which they are not obtainable in abundance for that purpose. Within the last few years tiles have been used to a limited extent. There is a tile manufactory in operation in the vicinity of Aberdeen, another in the parish of Forgue, and one in the division of Buchan; but, probably, the largest works of this kind in the county are those lately erected in the district of Byne. where drain-tiles, fourteen inches in length, are now sold at the rate of twenty-eight shillings per thousand. The usual price at the other tileries is, I believe, thirty shillings per thousand. In the neighbourhood of the slate quarries at Foudland the broken or refuse slates are very usefully employed as *soles* on which to rest the tiles. In many parts of Aberdeenshire, however, drain-tiles are almost entirely unknown, though there can be no doubt but that the establishment of a number of tileries in the district of Buchan, where there exists abundance of clay suitable for the purpose, would be of immense benefit to the farmers in that locality, as tiles at a moderate price would, in many instances, be considerably cheaper than stones, on account of their greater portability, and the greater degree of expedition with which the work can be accomplished by their use. The labour attending the quarrying, cartage, breaking, and filling-in of so heavy a material as stones renders them more expensive than tiles at the above-mentioned prices, except when the latter have to be carted a considerable distance; besides, the tile and sole are considered by many to constitute a more effective and durable drain, and will draw off the surplus water after a heavy fall of rain, sooner than that filled with stones.

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* Any farmer engaged in draining may readily and fully convince himself, should he be sceptical of the advantage of deep over shallow drains, by getting one cut some six or eight inches deeper than the rest, and observing, after the first heavy rain, or previous to its occurrence, if the ground happens to be very wet at the time, which draws the largest quantity of water.

The stones employed in draining are procured from two sources, viz., the surface of the ground, and the quarry. The small round stones annually gathered off the grass-fields, as well as those brought to the surface by the action of the tillage implements while preparing the land for green crops, are carted into heaps in convenient situations, with the intention of being subsequently employed (if necessary) in draining. The fields in most parts of the county contain a great number of such stones, and they are considered to be peculiarly well adapted for draining; they also constitute an economic material, since it is necessary or proper at all events, to collect and remove them off the ground; and they require little breaking preparatory to being put into the drains.

Not a few farmers, it is confessed, are still very sceptical of the propriety or advantage of filling drains with stones broken to nearly the size of road *metal,* even in situations where the practice might, in all probability, be adopted with safety and success. It is difficult to determine to what extent this is to be ascribed to prejudice; but, certainly, the objection to the use of small stones, thrown in promiscuously without forming a conduit in the bottom, is well founded in particular cases, and cannot be altogether attributed to the lingering attachment to ancient usage, which most farmers are so fond of manifesting in their practice. The greater proportion of the land that stands most in need of drainage in this county abounds with ferruginous matter, here denominated *iron ore.* The indurated stratum occurring in many places between the soil and subsoil, and known by the name of *moor-band pan,* to which I have already alluded as being, from its impervious character, one of the main causes of over-wetness, is a ferruginous deposit, consisting chiefly, I believe, of oxide of iron in chemical combination with certain organic acids. Now, wherever the oxide or peroxide of iron exists in any considerable quantity in the soil, it is considered injudicious by the majority of the Aberdeenshire farmers to drain with broken stones put in after the Deanston fashion, though they are almost unanimously of opinion that this method is the best that could be adopted in the draining of land containing only a due proportion of iron. In the former case the water impregnated with the ferruginous matter, in making its way through the stones, leaves an ochery deposit, that, sooner or later, renders the drains wholly useless, by obstructing the passage of the water. In several instances drains filled with broken stones have had to be re-opened, in consequence of becoming choked up, when the deposit alluded to was discovered, and at once accounted for the progress of the water having been impeded. This substance chiefly accumulates at the junction of the branch and main drains, and is always seen at their outfall.

The only effectual method, then, of thorough-draining with stones land thus abounding with salts of iron is to furnish each drain with a securely formed "eye" or open conduit in the bottom, which affords a channel for the free passage of water, and is not very liable to be rendered inoperative by the accumulation of deposit. This is more especially necessary in the case of ground having but little fall or inclination. But when the soil contains no undue proportion of ferruginous matter, it is admitted by all, that drains filled with the proper quantity of small-sized stones are equally, if not more, efficacious and durable, than those furnished with "eyes." It will be proper to describe briefly both methods of filling, and, first, when broken stones are employed without any conduit in the bottom.

Some difference of opinion still exists among farmers in reference to the most proper size of stones for thorough-draining. Many consider that it would be imprudent to reduce the stones to a smaller size than four-and-a-half or four inches in diameter, from an apprehension that the water would not make its way with sufficient celerity through those of less dimensions. Others, however, break them so as to pass freely through a ring three-and-a-half inches in diameter, and there are not a few who prefer them so small that the largest in the heaps may pass through a three-inch ring. The propriety of using stones of a small size is every year becoming more and more generally recognised in practice; and, as the size is diminished, the quantity put into the drain is also lessened. On one estate, the proprietor of which defrays the whole of the expense of draining, except the carriage of the material used for filling, the drains were, in 1844, filled with fifteen inches in depth of stones, broken so as to pass through a ring *four* inches in diameter; in 1845, all that were made were filled with twelve inches in depth of *three*-inch stones; and the regulation since the beginning of the current year is, that only nine inches in depth of stones, broken so small as to pass freely through a *two-and-a-half*-inch ring, shall be used. The drains, it may be proper to mention, are thirty-two inches in depth, fourteen inches in width at the top, and five at the bottom. I may here observe that Mr. Smith considers four or five inches of broken stones to be quite sufficient.

The stones are most generally laid down in cart-loads at proper intervals along the sides of the drains, either prior to the cutting being commenced, or while it is being performed. It is found advantageous, particularly during winter, to have the stones on the spot previous to cutting the drains, as it is desirable to fill them in immediately after being opened, in order to guard against the falling-in of any portion of the sides, which not unfrequently happens during wet weather, or after frost, and occasions much additional labour. Many farmers prefer, however, to get the stones broken at the quarry in large heaps, or *bens*, whence they are carted to the drains when required; and this is unquestionably the more judicious practice. The small stones that have, from time to time, been gathered off the fields are commonly broken to the required size at the heaps into which they had at first been formed. In both these cases the broken stones are carted to the drains as required, and shovelled into them from the carts, care being taken not to break down any of the soil from the sides, or to allow any earthy matters to get in among the stones.

The foregoing is the usual mode of filling drains with broken stones; but latterly some farmers have, with great advantage, been using an apparatus for the double purpose of expediting the operation, and of freeing the stones from all earthy matters. This consists of two separate articles, viz., a screen or "harp," as it is designated, and a strong wooden box called a "crib." The screen is formed of a number of strong iron rods attached to a frame of the same material; and the distance between the rods is such as to prevent any of the stones passing through while being freed from all *débris* and particles of earth. It is generally made four feet in length, two-and-a-half feet in width at one end, and twenty-six inches at the other. The wider end is furnished with two hooks, by means of which it is readily attached to the hinder part of each cart on arriving at the drain to be filled, while the other extremity is supported about a foot above the ground by a low wheel, on which the instrument runs when the cart to which it is affixed is moved. The purpose of the wooden box or crib is to receive the stones from the laden carts after passing over the intervening screen, and to deposit them in the drain. It is three feet in length, one foot in height, and six inches in width at the bottom—all inside measurements. It therefore contains rather more stones than are usually put into the same length of drain; but the precise quantity intended to be used can of course be regulated by placing a mark on the inside of the crib. The bottom is attached on one side by means of strong hinges, and on the other by a spring which is readily opened by drawing a little upwards an iron rod on the outside of the box. It is commonly formed of board three-quarter inch thick, strongly clasped with iron hoops rivetted to the wood, and is furnished with handles like a barrow. The price of the screen and box is about twenty-six shillings; and the manner of using them is as follows:—When a cart arrives with broken stones at the side of the drain about to be filled, the screen is attached to its hinder end, and the box is placed at the proper position at the lower end of the screen. The stones are then hauled or shovelled out of the cart, and, in descending the screen, are freed from all *debris* and earthy matters before reaching the box beneath, which, when sufficiently full, is emptied by two men. They stand with their legs on both sides of the drain, holding the box in the proper position between them; and, by drawing the iron rod in connection with the spring, the bottom gives way at one side with a smart jerk, on which the contents fall into the drain without carrying scarcely a particle of earth from the sides. In order to proceed with the greatest dispatch, two boxes and four men (besides the carter) are necessary; one party to be filling while the other are emptying. In this case the cart stands midway between two adjoining drains, both of which are filled simultaneously, and the cart is emptied of its contents without its position being altered. By the use of the very simple, cheap, and efficient contrivance, which I have thus rather tediously described, the filling-in of drains with broken stones is accomplished not only with much greater expedition than in the ordinary way, but in a more secure and perfect manner.

The stones, after being made uniform on the surface, which is very easily effected when the mode of filling just described is adopted, are covered with turf of about two inches in thickness, cut from the contiguous surface if the field is in grass at the time. Sometimes the first or top sods are reserved for this purpose. Heath, straw, and similar matters are also occasionally used when the land is in stubble or tillage. The covering of the stones with turf is a part of the process on which much attention is bestowed, as considerable damage may ensue to the drain from having it imperfectly performed.

In the construction of the other description of drain—namely, that furnished with an "eye," or square conduit—much care and attention must also be exercised. The eye is formed in nearly the same manner as the conduit of main-drains already described; stones of suitable size are placed at both sides of the bottom, upon which others are laid across the drain, thus forming an opening, the ordinary dimensions of which are three inches in width by four in height. In order to render this a substantial mode of draining, the side stones—or "cheeks," as they are designated—must be all of the same height, and be firmly laid upon the bottom, as the subsequent displacement of any of them would obstruct the passage of the water. The labourers accustomed to construct this kind of drain perform the work in a secure and expeditious manner. After the eye has been formed in the bottom of the drain, five or six inches in depth of broken stones are commonly, but not always, placed above the covers, and these are again covered with turf, straw, or other suitable material.

Not a few of the farmers still adhere to the old practice, when returning the earth thrown out in excavating the drain, of placing the loose surface soil next the covered stones, and keeping the more tenacious subsoil near the top. This is done with the view of facilitating the descent of rain-water into the drains; but many intelligent drainers are now opposed to the practice, and deny its propriety, as they deem it essential to the efficiency and durability of the drains to guard against the direct entrance of water from the top. It is considered preferable to force all the water to find its way into the drains by percolation through the subsoil; for, if permitted to enter through the loose earth above the stones, it must necessarily carry along with it a greater or less quantity of the soil, which will be deposited in the drain. The most approved practice, therefore, and that which is becoming general, is, after the stones or other materials used for filling have been properly covered with turf, to have a portion of the most tenacious of the subsoil well trampled with the feet, or beaten down with a wooden instrument adapted for the purpose. This consolidated stratum is commonly two inches in thickness. The remainder of the earth is then put in, sometimes with the plough, but generally by the spade; and a few turns of the harrows complete the process.

Although granite—an excellent material for draining—is obtainable in abundance in most parts of this county, yet there are some places where a sufficiency of stones cannot be procured for the purpose without incurring heavy expense in carting; and in these, recourse must be had to the most eligible and convenient substitute. It has already been mentioned that tiles are used to some extent in the vicinity of Aberdeen, and a few other localities, but that in most parts of the county they are scarcely known. A sort of drain-tile introduced a few years ago by Lord James Hay, of Seaton, near Aberdeen, was employed by many farmers for some time, but has fallen in estimation. The ingredients of which the *concrete* tile, as it is called, is composed, are good lime, sharp sand, and gravel, combined in the following proportions, viz., one bushel of lime-shells, two and a half bushels of sand, and four bushels of gravel, which will yield eight bushels of the composition (allowing half a bushel for the swelling of the lime by the application of water), and will make 120 tiles of one foot in length.

In reclaiming some boggy lands in the district of Buchan, several drains were formed with sods cut from the surface, and which have continued in efficient operation during a period of thirty years. By this means, and at a comparatively trifling expense, several hundred acres of peat moss have been completely and effectually dried, and, by liming and judicious tillage, have been brought into profitable cultivation. Sod or turf drains are resorted to with advantage in many quarters.

In other parts of the county, where stones are scarce and wood is obtainable at a cheap rate, the latter substance has been economically and advantageously employed in the formation of drains. The wood used for this purpose consists of the thinnings of plantations, *i. e.* the small trees commonly converted into paling. Larch is preferable, on account of its greater durability; but Scotch fir being the cheapest and most abundant kind in this quarter, is generally used. The drains to be filled with wood are usually thirty-two inches in depth, eighteen inches wide at the top, and about six inches at the bottom. It is essential to the efficiency and durability of wooden drains, that the sides be formed with a proper and regular slope from top to bottom. The small trees—or "spars," as they are designated—are prepared for being put into the drain, in the following manner: A portion of the butt or thick end of each is sawn off for placing transversely in the drain, about six inches above the bottom; the breadth of the drain at this part may be assumed at nine inches, in which case the length of the cross-bars will require to be about fifteen inches, so as to have three inches resting on each side. They are generally about four inches in diameter, and are placed in the drains at intervals of four feet apart; they are forced firmly into their proper position by a few blows of a heavy mallet, the workman taking care that they are all in the same plane or level. Any earth loosened from the sides in striking down the bars is, of course, thrown out as the work is proceeded with. After the butt-ends of the trees (which are divested of their branches in the wood) are severed, and placed transversely in the drains in the manner just described, the remainder of them are laid longitudinally above the bars, three being commonly placed side by side, and covered with the branches and twigs, or with turf, heath, &c., previous to putting in the earth cast out in opening the drains. It is obvious that this method of draining can be adopted with advantage only in situations where timber is convenient and cheap, and when the subsoil is sufficiently cohesive to afford a proper support to the transverse bars of wood; hence it is inadmissible in the case of boggy lands. The putting in of the wood is accomplished in a very expeditious manner: two persons saw off the butts, and another places them in their proper position in the drain, after which the longitudinal spars are laid on as closely as possible, with the top and butt-ends alternately in the same direction, so as to make them fit the better. There is thus formed beneath the wood a channel for the passage of water, of about six inches in width and the same in depth.

The cost of this mode of draining obviously depends much on the price of the wood employed. In most parts of this county the spars used for the purpose are obtainable at from 1s. to 1s. 6d. per dozen; and it requires four dozen, averaging twenty feet in length, to do a hundred yards of drain. Drains thus constructed have been known to last for a very long period; on one farm the writer has been assured that drains formed of wood in the manner just described have been in perfect operation for more than thirty years.

Coarse gravel is sometimes employed with much advantage in filling drains in bogs and swampy situations, where stones would sink into the soft and yielding bottom. A friend of the writer's drained several acres of mossy or spongy land, about six years ago, with coarse gravel, carted during frosty weather from a river in the neighbourhood; and the drains so filled are still in efficient operation. They were formed of considerable width, and filled nearly to the surface with the gravel; and the field in question was thereby rendered perfectly dry, and capable of being tilled in the same manner as the rest of the farm. The cost was very trifling. This material, when it can be conveniently procured, may also be used in draining short pieces of wet land at the bottom of fields; but it is unfit for a long length of drain, or where any considerable current of water is expected.

Expenses and Profits—As already stated, the operation of draining is executed almost exclusively by a class of labourers called "contractors," who are paid at a certain rate per hundred yards, and are obliged to engage as many assistants as may be necessary for completing the work within a specified period. It is seldom that any of the regular farm servants are employed in cutting drains. The expense incurred in thorough draining a field or piece of land must, it is almost needless to observe, vary, in a greater or less degree, with the texture of the soil and subsoil, the dimensions and distance apart of the drains, the rate of wages common in the locality at the time, and other obvious circumstances. The usual cost, however, of cutting furrow drains in this county is from five to six shillings per hundred yards—*i. e.* from 3⅓d. to 4d. per imperial rod or pole of 5½ yards—according to the depth; and when the contractor engages to break the stones, and put them and the earth into the drains, he usually gets from 10s. 6d. to 13s. per hundred yards (18·18 rods). The different items of the cost may be stated as follow, per hundred yards:—

	s.	d.		s.	d.
Cutting	5	0	to	6	0
Breaking stones........	3	0	to	4	0
Filling in ditto	2	0	to	2	3
Putting in the earth	0	6	to	0	9
	10	6	to	13	0

Main-drains or leaders, such as those described in a preceding page, commonly cost from 19s. to 22s. per hundred yards, or from 1s. to 1s. 2⅔d. per rod, for the cutting and entire construction. The foregoing rates are, of course, exclusive of carriage, which, in most cases, forms a considerable item of the expense; the quarrying of the stones, when necessary, also costs a pretty good sum per acre. There are 726 yards, or 132 rods, of drains in the statute acre, when the distance between them is 20 feet; but, as the cost of draining, per acre, depends so much on the size of the field, the length of main-drains required, and the distance stones may have to be carted, I consider that the most satisfactory mode of illustrating this part of my subject will be to introduce here a few statements of expenses that have actually been incurred in thorough draining in Aberdeenshire. It is presumed that many of the readers of an agricultural periodical are more or less engaged in draining, and that such authentic accounts of the expense incurred by other farmers in executing that fundamental improvement, cannot fail to be acceptable.

I shall give, first, a statement of the cost of thorough draining, with broken stones, a field of twelve imperial acres, which has been kindly furnished me by a friend who has drained very extensively during the last ten years. In Aberdeenshire draining is executed at a certain rate per hundred yards; but in the following statements I have reduced the figures so as to show the cost per English rod, which will probably be more generally understood. It is proper to mention that the soil of the field in question, before being drained and subsoil ploughed, was of a very variable description, from light spongy peat to retentive clay. The substratum was mostly of an indurated character, but in some parts it was so soft as to render it necessary to place thin pieces of wood along the bottom, in order to prevent the sinking of the stones. The draining was commenced in the spring of 1834, the field being then in oat stubble. The small or parallel drains, of which there are 1,512 rods in the field, are 21 feet asunder, 32 inches in depth, 16 inches in width at the top, and 5 inches at the bottom. There are 61 rods of main-drains, which are 3½ feet in depth and 2 feet 3 inches wide at the bottom, previous to the construction of the conduit. The breadth at top varied according to the nature of the soil and subsoil. The "eye," or opening of the leaders, is 9 inches in height, the same in breadth, and is formed in the usual manner, with broken stones above the covers to within 18 inches of the surface of the ground. The bottom of the main-drains was paved with round stones previous to the formation of the little side walls of the conduit, this having been rendered essential in many parts of the field by the spongy character of the subsoil. The drains were all cut by contract, at the rate of 3½d. per rod for the small drains; a separate agreement was entered into for constructing the leaders, which were opened and formed in the manner described for 4d. per yard. The cost of this part of the work, therefore, stands thus:—

	£	s.	d.
To cutting 1,512 rods of small drains, at 3½d. per rod........	22	1	0
To cutting and forming 61 rods of main-drains, at 1s. 10d. per rod	5	11	10
Whole cost of cutting, &c..	27	12	10

The greater proportion of the stones employed in filling were collected at different periods off the grass and other fields, and were formed into a large heap in a convenient situation, where they were broken so small as to pass through a ring of three inches in diameter. This was done at the rate of 3½d. per ton, the stones not requiring much breaking. The quantity requisite for the drainage of the field was 660 tons, exclusive of those taken up in digging and those that had to be quarried for the construction of the main-drains. The expense of breaking the stones may therefore be stated as follows:—

	£	s.	d.
To breaking 660 tons stones, at 3½d. per ton	9	12	0
To breaking stones thrown out in digging drains	1	12	0
To 73½ days of a man breaking stones, at 1s. 8d. per day.......	6	2	6
Total cost of breaking stones..	£17	6	6

As has already been observed, the stones were broken in a large heap or "bin," whence they were carted to the drains so soon as the opening was completed, and shovelled out of the carts into the drains, to the depth of 12 inches. The stones having been made level on the top, were carefully covered with turf brought from an adjoining pasture field; and in putting in the earth, a portion of the stiffest of the subsoil was beaten firmly down upon the turf. There are thus in each drain 12 inches of broken stone, surmounted by 2 inches of turf, 2 inches of consolidated clay, and 16 inches of soil. The cost of the various operations now referred to has been estimated as follows:—

	£	s.	d.
To 22 days of a man and a pair of horses carting stones to small drains, at 9s. 6d. per day......	10	9	0
To 66 days of a man filling stones into carts, and afterwards putting them into the drains, at 1s. 8d. per day..................	5	10	0
To 12 days of a man and a horse carting broken stones and covers to main-drains, at 6s. per day ..	3	12	0
To 18 days of a man filling ditto, at 1s. 8d. per day............	1	10	0
To 20 days of a man cutting turf, and placing it above the stones, at 1s. 8d. per day	1	13	4
To 3 days of a man and a horse carting turf for drains, at 6s. per day......................	0	18	0
To 4½ days of a man and a pair of horses ploughing in the earth over the stones..............	2	2	9
Total cost of filling..	£25	15	1

The entire cost of draining the field will, perhaps, be rendered clearer by the following recapitulation:—

	£	s.	d.
Cutting of small and main-drains, including the filling of the latter	27	12	10
Breaking stones	17	6	6
Carting and filling stones and turf, putting in the earth, &c.......	25	15	1
Total cost of draining 12 acres..	£70	14	5
Cost per statute acre..........	£5	17	10 $\frac{5}{12}$

This is certainly a high sum for the drainage alone, and doubtless the work might have been accomplished somewhat cheaper; but if the expense has been high, the operation has been most substantially executed, and we shall presently see how beneficial have been its effects. Economy is by all means to be studied in the performance of every agricultural operation, and especially in executing so costly a one as draining; but it is certainly a most mistaken economy to construct drains in a slight, hurried, and necessarily imperfect manner. All the drains not having been completed until the spring was far advanced, it was determined to subject the field to a course of summer fallowing, chiefly with the view of extirpating the weeds with which the ground was infested. I shall advert merely to the subsoil ploughing, this operation being so intimately connected with draining. The subsoil plough (Smith's, of Deanston) required four horses to work it, and was preceded by a common plough, drawn by two horses, both instruments penetrating to the depth of fifteen inches beneath the surface, or as far as could be done without endangering the drains. A woman followed the subsoil-plough with twigs, to mark the situation of the stones encountered by that implement, which were so abundant that three men were kept actively employed in taking them out of the ground during the fourteen days occupied in accomplishing the subsoil ploughing. The following is the account of expenses attending the process:—

To fourteen days of a man and a pair of horses, at 9s. 6d. per day	£ 6	13	0
To fourteen days of two men and two pair of horses, at 1*l.* per day..	14	0	0
To forty-two days of a man taking out stones, at 1s. 8d. per day....	3	10	0
To fourteen days of a woman marking stones, at 10d. per day......	0	11	8
To wear and tear of subsoil plough, estimated on an average at 1s. per day........................ ..	0	14	0
Total cost of subsoil-ploughing field.	£ 25	8	8
Cost per acre............	£ 2	2	4$\frac{2}{3}$

Consequently the entire expense of draining and subsoil ploughing this twelve-acre field has amounted to no less a sum than 96*l.* 3s. 1d., or 8*l.* 0s. 3$\frac{1}{12}$d. per acre.

After undergoing the usual course of tillage in summer fallowing, the land got a top-dressing of lime, and street-dung from Aberdeen, and was sown with wheat in the autumn of 1834. It is worthy of remark that this was the first time wheat was ever attempted to be grown in the field in question. The utility of draining cannot be better illustrated than by a comparison of the crops raised in this field prior and subsequent to the execution of that improvement. Subjoined is a statement of the actual produce and value of the crops from 1829 to 1833, inclusive.—

1829, turnips, a miserable crop, barely worth 2*l.* per acre	£ 24	0	0
1830, oats, 31 qrs. 7 bush. (2 qrs. 5$\frac{1}{4}$ bush. per acre) at 25s. per qr.	39	16	10$\frac{1}{2}$
1831, first year's grass, (depastured), valued at 27s. 6d. per acre	16	10	0
1832, second year's grass, (depastured), valued at 1*l.* per acre	12	0	0
1833, oats, 24 qrs. 7 bush. (2 qrs. 0$\frac{7}{12}$ bush. per acre) at 35s. per qr. .	43	10	7$\frac{1}{2}$
Value of crops on twelve acres for the five years preceding the drainage	£ 135	17	6

The following are the returns of the crops from 1835 to 1839, inclusive:—

1835, wheat, 49 qrs. 1 bush. (4 qrs. 0$\frac{3}{4}$ bush. per acre) at 50s. per qr...	£ 122	16	3
1836, first year's grass, (depastured), valued at 47s. 6d. per acre	28	10	0
1837, second year's grass, (depastured), valued at 32s. per acre....	19	4	0
1838, oats, 57 qrs. 1 bush. (4 qrs. 6$\frac{1}{12}$ bush. per acre) at 25s. per qr.	71	8	1$\frac{1}{2}$
1839, turnips, valued at 5*l.* 13s. per acre	67	16	0
Value of the crops for the five years succeeding the drainage	£ 309	14	4$\frac{1}{2}$
Value of the crops for the five years preceding the drainage..........	135	17	6
Increase in value of produce of twelve acres, in six years............	£ 173	16	10$\frac{1}{2}$
Cost of draining and subsoil ploughing	96	3	1
Gain in course of six years	£ 77	13	9$\frac{1}{2}$

One year's rent and the expense of the fallowing and manuring should, perhaps, be deducted from this sum; but still it will be seen that the cost of draining and subsoil-ploughing the field referred to has been soon and most amply repaid.

The foregoing interesting facts have been furnished the writer by an intelligent agriculturist, on the accuracy of whose statements he can place perfect reliance. Several other important advantages, besides that illustrated above, have also accrued from the drainage; not the least pleasing of which is, that while the productiveness of the soil has been greatly increased, the expense of cultivating it has been considerably diminished.

I have received from several farmers in different parts of the county interesting statements of the expense incurred in, and the profits arising from, draining, which I intended to give in detail; but my observations having already, I fear, extended to greater length than will be agreeable, I shall introduce only a few of the more important facts.

A farmer who had put down in 1844 1,761 yards, or one mile, of main drains, and 14,895 yards, or 8·46 miles of small drains, at a cost (for cutting and filling) of from 16s. to 22s. for the former, and from 10s. to 13s. for the latter, per hundred yards, exclusive of carriages, and in 1845 nearly the same extent, states that the improvement in the land consequent on its drainage has been both immediate and very marked. The crops of every description, and more particularly turnips, have been considerably augmented in quantity and improved in quality, while the ground may now be ploughed or otherwise tilled in all states of the weather, except during hard frost. The value of the grass has also been greatly enhanced, the pasturage being more abundant and the herbage more nutritious. He is of opinion that the cost of thorough drainage is in most cases repaid in five or six years.

Mr. James Porter, the intelligent overseer of Logie-Elphinstone, the home farm of Sir Robert D. H. Elphinstone, Bart., made an experiment last year with a view to ascertain the influence of draining on the first crop. The soil is naturally very poor, being a thin yellowish clay, resting on a subsoil of hard gravel and clay. The whole of the field, except half an acre, was thorough-drained with broken stones in the autumn of 1844 at a cost of 4*l.* per acre exclusive of carriages. For the purpose of comparison, another half acre was measured off adjoining the undrained portion. The field was sown with Kildrummy oats on the 26th March, 1845, and the crop was reaped between the 14th and 21st of September. The following is a tabular statement of the result:—

Plots.	Marketable Oats on the half acre.	Weight per bushel.	Second quality of Oats on the half acre.	Weight per bushel.	Shillocks or inferior grain.	Whole produce of the half acre, exclusive of shillocks.	Weight of Straw.
	qr. b. pk.	lbs.	qr. b. pk.	lbs.	lbs.	qrs. b. pks.	cwts. qr.
1. Drained	2 2 0	41	0 3 3	38	89	2 5 3	15 1
2. Undrained ..	1 5 1	39½	0 2 1	37¼	69	1 7 2	12 0
Increase per half acre	0 4 3		0 1 2		20	0 6 1	3 1

It thus appears that even on the first crop after draining there was an increase of above one quarter and a half of grain, and 6½ cwts. of straw per acre, the value of which goes far to repay the expense of the operation.

Mr. Walker, Wester-Fintray, has drained extensively for some years past. All his drains are provided with open conduits, or "eyes," as the land abounds with ferruginous matter, and the cost varies from 4*l.* to 6*l.* 5s. per acre, according to circumstances. The most beneficial results have accrued from drainage on both his farms; one of the fields which was recently drained was last year in turnips, and the produce was valued at 6*l.* per imperial acre. When the same field was previously under this crop it was barely worth 3*l.* per acre.

In the low-lying parts of Aberdeenshire the expense of draining is not unfrequently repaid by the increased produce of the first three crops grown after the operation has been executed; but in general it is not expected to be fully returned until two courses of crops have been raised. There are some soils so naturally sterile as not entirely to repay the cost of thorough draining during the currency of a nineteen years' lease, if the increase of produce be alone taken into consideration; but several other advantages are also derivable from efficient drainage, to which, however, it is unnecessary to advert in this place.

ON THE RATIONALE OF CERTAIN MANURES EMPLOYED IN AGRICULTURE.

BY PROFESSOR DAUBENY, OF OXFORD.*

It might be deemed an act of presumption in one like myself, whose claim to address such a meeting as the present on subjects connected with agriculture arises merely from some acquaintance with the principles of scientific chemistry, to present to the practical farmer any method of culture at variance with his actual experience. The application of science to the details of husbandry is, indeed, too recent to justify on the part of any of us chemists such an assumption; and our leading authorities are, it must be confessed, at issue on too many points to inspire sufficient confidence in their dicta when they chance to run counter to the persuasions entertained in the district or county.

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* Read at the Chemical Section of the British Association, on Friday, September 11, 1846.

But, on the other hand, the practical agriculturist must himself admit that even those methods and operations which he is in the daily habit of pursuing with the greatest confidence of success frequently disappoint his expectations, and that the best-conducted system of husbandry is subject to casualties, against which no foresight can at present provide, and no amount of experience will secure him.

To afford, therefore, a rational explanation of the mode in which the substances applied by the farmer to his land cause it to yield more abundant crops cannot be regarded by him as a superfluous undertaking, more especially when it is recollected that an entire exemption from theory implies a state of mind almost incompatible with the earnest prosecution of any line of pursuit, that the practical farmer is in his own way often the most inveterate of theorists, and that, even if a correct theory did not assist, an erroneous one would be sure to mislead us. The proper province, therefore, of the man of science, who attempts to apply his theoretical knowledge to the advancement of agriculture, seems to me to be that of endeavouring to extract from the statements of practical farmers the groundwork of some rational theory with respect to the uses of the various substances whichlong experience has led men to employ in the improvement of the soil; thus enabling us to apply them, not, as at present, at haphazard, but with some degree of discrimination, and with reference to the particular circumstances of each case.

Now, amongst the whole list of bodies enumerated under the general, but rather vague, terms of manures, or fertilizers, there is, perhaps, none of more extensive use, and few more capacious in their effects upon the land, than quicklime; and I may therefore select it as the subject for a few remarks, in order to illustrate the position with which I set out, by showing that, if we could enlighten the farmer as to the manner in which it affects the land, we might save him much disappointment by explaining when it is likely to be useless, and when, perhaps, even detrimental in its effects.

I am aware, indeed, that I have selected a topic which some may regard as almost exhausted, for all who have consulted the recent treatise of Professor Johnston on agricultural chemistry will admit that he has communicated in it a very able and correct account of the uses of lime in agriculture; nor, with this work before me, should I, concurring as I do in the general tenor of his remarks, have brought this subject before you on the present occasion, were it not for the sake of drawing attention to one in particular, amongst the various uses attributable to this substance, which seems to receive light from the principles that I ventured to lay down in the conclusion of a memoir on the rotation of crops, lately published in "The Philosophical Transactions."

In this memoir I endeavoured to elucidate the distinction that exists between that portion of the ingredients of a soil which is in a state to become available for the immediate purposes of the plant, owing to its being readily soluble in the water that penetrates the ground, and that which is not at present brought into a condition of such easy solubility, and consequently at the present moment does not contribute in any degree to the development of the vegetables that grow in it. The former portion I have distinguished as its active, and the latter as its passive ingredients; and I proposed to estimate the relative amount of each, by treating the soil, first with a definite quantity of water impregnated with carbonic acid gas, and afterwards with diluted muriatic acid, and determine the several quantities taken up by the first and by the second of these re-agents. The former I conceived would be likely to represent the amount which was actually applicable to the uses of the plant, since it is to be presumed that what could not be extracted by a large quantity of water holding carbonic acid in solution would not be taken up by the rain-water which might penetrate the substance of the soil, whilst that which was dissolved afterwards by muriatic acid was likely in the course of years to be brought naturally into a similar condition.

These positions I illustrated by showing that a soil exhausted by growing a series of crops without manure was in point of fact more deficient in their ingredients, which were in an active or immediately available condition, than another which had been more recently manured, although the passive ingredients present in the latter might not be sensibly greater in amount.

If these principles be admitted, we shall be naturally led to inquire whether certain of the operations in agriculture, which long experience has sanctioned, may not derive their advantage in part from accelerating that process of disintegration in the soil which renders it more amenable to the influence of atmospheric agents.

Thus amongst the mechanical operations which may contribute to bring about this result I might instance ploughing, and other means of pulverizing the soil, and of bringing a larger amount of surface into immediate contact with water, carbonic acid, &c.

Perhaps the discordant reports which are given us as to the effects of subsoiling upon different descriptions of land might be reconciled by considering whether the latter was in a condition to allow of its dormant ingredients being rendered available within a short period.

Whether this was the case, it is evident that any process which should transport nearer to the surface a supply of materials calculated to afford food to plants will add to the richness of the land; whereas, upon the contrary supposition, its addition must, for some time at least, introduce a greater degree of sterility, not only from mechanical reasons, which are obvious enough, but also by tending still farther to diminish the already deficient proportion of active ingredients present in the surface soil.

But, without dwelling farther upon this and other operations belonging to the same class, I will proceed to consider the chemical means by which the same end is, as I conceive, likewise brought about, and amongst the rest may allude to the practice of liming, which is now of much general use throughout the country.

Its effect in rendering the organic matters more soluble, or rather as I should prefer to represent it, in promoting their decomposition, so as to render them better adapted for supplying both carbon and nitrogen to growing plants, has been already sufficiently explained by Professor Johnston, and by others. Its action upon the inorganic matter, though not altogether unnoticed, has perhaps been rather less attended to.

Yet, when we recollect that quicklime mixed with pounded granite speedily liberates the contained alkali, as was first established by Professor Fuchs, of Munich, and has since been introduced as a practice of Mr. Prideaux, of Plymouth, and when we recollect, moreover, that many of the clays and claystones which compose the bulk of several rock formations in secondary and tertiary districts are derived from granite rocks, we cannot doubt that the action of quicklime upon the latter will be of an analogous description, and that a liberation of the alkali present in the rock will be one of the consequences of its application.

Nor is this a mere matter of theory; for I have myself found that twice as much alkali could be extracted from the soil of a portion of the Botanic Garden at Oxford, which had been exhausted by growing a number of successive crops of poppies for fourteen years without any manure having been employed, after it had been left in contact with slaked lime for a fortnight, than was obtainable from it alone; the solvent employed for taking up the alkaline salt being in both instances water impregnated with carbonic acid, allowed to trickle slowly through the respective samples of soil.

According to this view of its mode of application we can more readily understand why it should be applicable to argillaceous soils rather than to calcareous ones—not merely because it supplies the lime which most plants require for their organization, for this might be effected by carbonate of lime as well as by the pure earth, and indeed would scarcely be required where, as is often the case, the clay contains in itself a small parentage of calcareous matter, but because clays usually contain alkali, whilst limestones do not.

We may also explain why the frequent liming of a soil tends to produce exhaustion; for if the effect of this substance be to convert its dormant ingredients into its active ones, or to render their principles, which from their state of combination were but sparingly soluble, more immediately available for the uses of the plant, it is plain that every fresh application of it will tend to diminish more and more the amount of these ingredients, not only by what is actually taken up by the plants, but likewise what is gradually carried away by the rains that percolate the soil.

By too liberal a supply of lime, therefore, we seem to be undoing the wise provision of nature, which aims at counteracting the great solubility of the alkalies, by retaining them in a state of combination with the other earths from which they are slowly liberated; thus anticipating the ingenious expedient of an illustrious chemist of the present day, who, in order to prevent the alkaline ingredients of his manure from being carried off before the crop has had time to take them up, combines them with carbonate of lime, and thus produces a more sparingly soluble combination.

Let us, indeed, for a moment stop to consider what would have been the consequence had this natural provision for economizing the resources of the soil been omitted; one of the most formidable of which would have been that, before the present stage of the world's extence, all the alkalies existing in the superficial strata of the earth must have found their way into the ocean, when, even supposing their presence in such excess had not proved destructive to the marine plants which take them up—supposing even their abundance to have stimulated the marine vegetation, and thus to have afforded an exuberant growth of algæ adapted for manuring the tracts of land that lie contiguous to the sea—still the inland portions of our continents must have remained absolutely barren, from the impossibility of transporting, to any great distances from the coast, the produce of the sea, which in the case supposed could alone have returned to the land those soluble ingredients which the rains of preceding ages had carried away. These consequences are prevented by the state of combination in which the alkalies naturally exist in the soil, as they are thus brought into solution so sparingly, that the whole, or nearly the whole, of them present in the water which the soil retains is taken up by plants, whilst the latter, as they decay, render these principles back again to the soil in a more available condition; indeed, but still in one which opposes some impediments to their being carried off speedily by water.

Hence the vast accumulation of alkalies locked up within the forests of most thinly peopled countries—hence the unrivalled fertility of virgin soil, enriched by the annual tribute paid to it by these forests at the period of the fall of the leaf—hence, too, the miasmata so apt to occur in new countries thus circumstanced, whenever the soil is disturbed by the processes of agriculture, and the decay of the vegetable debris accelerated by the free introduction of air and moisture.

I may here just allude to another interesting provision, by which the slow but continuous disengagement of alkalies from certain rocks of igneous origin seems to be secured.

I allude to the fact, that, whilst igneous rocks which have cooled rapidly appear to be in the condition of glass—that is, to have their constituents brought into that state of intimate union which render them almost unattackable by ordinary acids, and of course, therefore, scarcely decomposible by atmospheric agents—the greater portion at least of submarine lavas, or of volcanic products which have cooled slowly under pressure, consists of an intimate mixture of glassy felspar with some member of the zeolitic family, the characteristic of which is its easy solubility in acids.

Nor is this property confined to submarine products, for Dufrenoy has shown that the modern lavas of Vesuvius are distinguished from those of the Monte Somma by being soluble in acids in the proportion of 4 to 1.

Nature, therefore, appears to have provided means for the slow disengagement of alkali, not only in the case of plutonic rocks, but also in those of more modern volcanic origin, by causing the materials of which they consist not in general to assume a vitreous condition, but to separate in the act of cooling into a certain number of definite combinations, some of which, at least, acids are capable of attacking, and which, consequently, would be liable to yield to the continued influence of atmospheric agents.

Another chemical agent which seems to operate in promoting vegetation, somewhat upon the same principle as lime has been represented to do, is sulphuric acid. An example of its operation is appended in the now familiar process of treating bones with this acid, as the earthy phosphates are by this means brought into a soluble form, and are therefore rendered more fit to be assimilated by plants.

This, at least, I apprehend to be the true theory of the advantage derived from its use when mixed with bones; for, although the phosphoric acid is introduced to the soil as a superphosphate, still it is not as such that it enters into the structure of the plant; and it therefore follows, that it must have combined with its usual quantity of lime before it was taken up by the roots.

A case, however, of a more precisely parallel description is afforded by the practice, adopted in some parts of the Continent, of sprinkling the soil with sulphuric acid.

Here, in the first instance, a certain amount of gypsum is generated, which acts beneficially upon certain crops, by supplying them with a material needed for their inorganic constitution.

This end, however, might be attained at a cheaper rate by applying gypsum already formed; but, then, it is to be considered that sulphuric acid in the very act of producing this salt disintegrates the soil, releases its component parts from the cohesive attraction which before acted as an antagonist force to chemical affinity, and also, above all, converts the minute quantity of phosphate of lime present in most soils into a superphosphate, thus rendering it more soluble.

If we put together all these several advantages, it may be conceived that a dressing of sulphuric acid will often succeed better than one of gypsum would do, the superior cost of the article being compensated by the benefit accruing from its power of converting the dormant principles of the soil into those which are active, or directly available for its purposes.

In alluding to the subject of gypsum, I cannot refrain from pointing out that it affords a striking illustration of the great uncertainty which still prevails with respect to the theoretical principles by which the practice of agriculture is at present guided.

We have here four distinguished authorities in the science of agriculture, namely, Sir Humphrey Davy, Baron Liebig, Monsieur Boussingault, and Professor Johnston, of Durham, expressing as many distinct views with respect to the operation of this agent as a manure—Sir Humphrey regarding it as advantageous by reason of both its constituents, that is, acting as sulphate of lime; Baron Liebig directly by neither one, but indirectly as fixing the ammonia of the atmosphere; Boussingault attributing its usefulness to the lime it contains, and Professor Johnston chiefly to its sulphuric acid.

I allude to this discrepancy of opinion rather in order to press upon the minds of agriculturists the importance of instituting inquiries for the purpose of ascertaining more precisely the *modus operandi* of this and other measures, than for the sake of obtruding any views of my own on the question more immediately before us—views which have not been tested by any specific train of experiment, and which are therefore the less worthy of being brought into competition with such distinguished philosophers.

Nevertheless, I may remark, that, of the four theories just mentioned, the one proposed by Boussingault seems to me the most destitute of probability. It offers, no explanation whatsoever of the peculiar adaptation of gypsum for plants of the leguminous order, nor for the preference which practical men assign to its use over that of lime, where the latter is so much more accessible, and consequently, beyond all comparison, more economical. The opinion is based upon a series of experiments, which tend to show that clover treated with gypsum not only contained more sulphate of lime than it had without it, but also a larger proportion of lime in other states of combination—a very natural consequence, in my opinion, supposing the absorption of the quantity of gypsum which was congenial to its organization had invigorated the system of the plant, and thus had enabled it to draw more largely from the soil than it otherwise could have done.

The converse hypothesis experienced by Professor Johnston seems hardly consistent with the fact that gypsum is better adapted for leguminous plants than for cereals, inasmuch as the latter, according to Boussingault, yield quite as much sulphur on analysis as the former.

With regard to the remaining hypothesis, propounded by Sir Humphry Davy and by Baron Liebig, it is probable that both the causes assigned by these two philosophers may have a share in the virtues which belong to gypsum as a manure.

All authorities concur in asserting that those crops which contain the largest amount of sulphate of lime in their composition are most benefited by the application of the substance in question ; and, indeed, even the experiments of Boussingault, which are alleged in opposition to this theory, evince that clover treated with gypsum contained in its ashes more of this ingredient than it had done under other circumstances.

But there is one mode of applying gypsum much practised on the Continent, and also in the United States of America, which seems to imply a distinct mode of operation from the other. This is the practice of scattering gypsum in fine powder over the leaves of the crop when just rising above the ground, which is stated to invigorate the stem and leaves, and even to extend its beneficial influence to the roots themselves.

This circumstance would seem to point to some function of the substance employed in absorbing ammonia, and thus bringing this highly important substance into immediate contact with the parts which are most ready to assimilate it.

M. Boussingault objects to this view of the subject on grounds that appear to me exceedingly inconclusive. He begins by calculating that the quantity of clover covering an acre of land had gained by the application of gypsum as much azote as it would have required 134 lbs. of carbonate of ammonia to produce.

Now, the average quantity of rain which falls in Alsace could in no case convey to the gypsum in a year anything approaching to that quantity of carbonate of ammonia, so that it is impossible that the application of gypsum to the land could have generated the whole of that quantity. But who does not see that the gypsum, according to Baron Liebig's hypotheses, would not only absorb ammonia from the rain water, but also condense that which was exhaled from the ground, in consequence of the decomposition of animal matters; and it is the more surprising that this should have been overlooked by Boussingault, as he states just afterwards that gypsum exerts no truly beneficial influence upon artificial meadows, excepting when the soil to which it is applied contains an adequate proportion of azotised organic manure.

The practice, therefore, of sprinkling the clover leaves with gypsum may have its use in arresting the ammonia exhaled from the ground, as well as that which descends with the rain from the heavens, and in bringing both the one and the other into immediate contact with the absorbing surfaces of the plant.

According to this view of the subject, the uses of gypsum in agriculture will be partly *general* and partly *special*—general, in fixing ammonia, which all plants more or less require ; special, in supplying sulphate of lime to those species which contain it in their organization, and therefore most serviceable to those, like the legumenæ, which contain the largest proportion of this ingredient. When the substance alluded to is sprinkled over the leaves of the young crop, as is the case in France, it would seem that the first of these objects is the one principally attained ; where it is mixed with the soil, the second.

The former mode may prove serviceable, whatever may be the composition of the soil itself ; but the latter method of administration appears to presuppose that the soil was deficient in it, and, consequently, ought to be preceded by an actual analysis of its ingredients.

TENANT RIGHT.

WINGERWORTH FARMERS' CLUB.

The usual monthly meeting of this association took place on Tuesday, September 8, at the "Hunloke Arms" inn—John Brown, Esq., steward to Sir H. Hunloke, in the chair. Mr. James Brotherton having given notice at the last meeting that he should this evening discuss the question of "Tenant Rights," as connected with leases, &c., there was an unusually full attendance of members, besides several strangers, some of whom were subsequently admitted as members of the club. Among the latter was Mr. Wright, the eminent agriculturist (late of Romley), whose enrolment as a member of the club was hailed with much satisfaction by the meeting.

The **Secretary** having read the minutes of the last meeting,

The **Chairman** called upon Mr. James Brotherton to open the subject for the evening's discussion.

Mr. **James Brotherton** then rose and said that, in pursuance of the notice he had given at the last meeting, it was his intention this evening to propose for their consideration the question "What are the practical impediments to the improved development of British husbandry ?" And he was aware that, in selecting a topic of this great importance, embracing as it did so wide and varied a field, he might, perhaps, be justly chargeable with presumption, especially in a society which numbered amongst its members so many who, from long practical experience and intelligent observation, must necessarily be more competent to the task. However, relying partly on their indulgence, and partly on a belief that he might be able to discuss some branches of this question with greater freedom and less risk than some others he saw around him, he (Mr. Brotherton) had ventured to undertake it. And he had been influenced by various considerations. In the first place, he conceived that the time had now arrived when it was imperative on the farmers of this country to discuss freely and without reserve all and every topic which directly or indirectly, remotely or nearly, affected their interests. The time for squeamish timidity or apathetic indifference had gone by. That which less than a year ago had been a matter of speculative doubt, depending on the precarious turn of political events, had now become a simple record of history. A parliamentary statute had declared that the farmers of this country must no longer depend upon legislative enactment for protection or assistance in their calling, but must rely solely on their own energy and skill. The question, then, naturally arose, "How were that energy and skill to be best applied ? and, more especially in the first instance, what were the obstacles in the way ?" And this formed the subject, to a very brief outline of which he (Mr. Brotherton) should direct their attention this evening. He hoped, however, on a future occasion to go more largely into the details connected with direct improvements ; but he thought the discussion of this branch of the subject would be more advantageously taken under the improved circumstances which he (Mr. Brotherton) hoped a clearer apprehension of the obstacles in the way would create. He conceived, then, that the main obstacles to improved husbandry resolved themselves into three principal heads—viz., want of capital, insecurity of tenure, and the restrictions to which the occupiers of land were exposed in the cultivation of their farms. First, then, with regard to the want of capital. He (Mr. Brotherton) thought it would not be denied, that a large proportion of the farmers of this country had taken into their occupation more land than they had capital to cultivate efficiently, and that, in too many instances, the capital they possessed had been injudiciously applied. This he took to be an admitted fact, and one which a short review of our agricultural history during the last sixty years, might possibly explain. It would be in the recollection of some of his (Mr. Brotherton's) older friends in the room that from the year 1792 to the year 1814 the land of this country very considerably increased in value. This was doubtless owing to a variety of causes, but principally he (Mr. Brotherton) thought to the enormous prices of agricultural produce during the war. These high prices had given rise to an intense competition for farms. The applicants, perceiving only the bright visions of a golden future, redolent of the luxuries of an early acquired opulent independence, and believing that the possession of a farm was tantamount to a realization of the alchemist's dream, and that, like the widow's barrel of meal and cruise of oil, the high prices would be a continuing and never-failing source of profit, bid recklessly against one another for the possession of farms. And they had done this, alike regardless, in too many instances, of either the possession of the requisite knowledge and skill, the terms upon which they obtained the land, or the adequacy of their capital to cultivate with any prospect of permament success. The sole question had been, "How much land they could contrive to get into their occupation," rather than the much more rational question—"How much land the capital they could command would cultivate efficiently." This state of things had lasted till the close of the war, when as they would probably recollect, prices began to decline. Then it was that the landowners—who, of course, had enjoyed their share of advantage from the fierce competition for farms, in the shape of high rents—began to foresee an ominous change. They perceived that, unless some contrivance could speedily be resorted to, the palmy days of high rents and feudal dependencies were numbered. They accordingly set their wits to work to discover how this evil was to be avoided, and at last they pounced upon a clever expedient which ultimately assumed the shape of the corn law of 1815. By that law, as the meeting were aware, foreign corn was prohibited from importation when the price in the English market was under 80s. a quarter. It had accordingly been assumed that, on an average of years, this enactment would secure a range of prices bordering closely upon 80s. the quarter. The landlords and the farmers alike believed that the law would have this effect. The former revalued their estates, and the farmers again entered into a fierce competition for farms. What had been the result? They all knew that the law of 1815 had utterly failed in its object, and that great agricultural distress soon followed its enactment. The law was altered in 1822, again in 1828, a third time in 1842, and lastly in 1846, when the legislature declared they would no longer attempt to maintain prices by acts of parliament, seeing that utter failure had attended every enactment they had passed with that object. He (Mr. Brotherton) thought it was obvious, from this short sketch of our agricultural history, that the farmers had relied on the efficacy of the various legislative enactments to secure remunerative prices, rather than upon the outlay of that capital and skill which alone could ensure permanent success. But we had now commenced a new era. The farmer was left to his own resources. And in the close competition to which he must now be inevitably exposed, his only chance of occupying a successful position must depend upon an increased application of capital, industry, and skill. But, as it had been well observed, "capital instinctively shrinks from insecurity;" and no man would voluntarily lay out his capital in improving his farm, unless he had a rational security that he or his descendants should enjoy the just fruits of his enterprise; and that security could, in his (Mr. Brotherton's) opinion, be alone afforded by a lease. And this brought him to the second and most important branch of his subject. And in approaching it, he felt considerable hesitation, not unmixed with anxiety. For he was aware that, speaking as he did, in the heart of a district, where tenancies at will were the rule, and leases, if they existed at all, were the almost solitary exception, he might have difficulties and prejudices to overcome, which his feeble powers might be inadequate to surmount. And, indeed, if he had only his (Mr. Brotherton's) own unsupported opinion to offer them, he should utterly despair of making any favourable impression on their minds. But supported, as he was, by the authority of some of the most intelligent men and eminent agriculturists in the kingdom, he (Mr. B.) was sanguine enough to hope that the discussion would not be raised in vain. He would first of all premise—he took it as an admitted fact—that the land of this country was, for the most part, undercultivated; that its produce was by no means adequate to its capabilities. This he took to be an undeniable truth. For go where they might, their own observation, and the proceedings at every agricultural gathering throughout the country, afforded abundant evidence of this fact. At every one of these meetings, from the Royal Agricultural Society of England, down to the humblest village farmers' club, the universal language, the burden of every song, was the necessity for improvement. But he had observed this peculiarity: at those meetings where the landowners were the speakers, the tone and sentiment adopted were very different from that which prevailed at meetings which were composed purely of tenant farmers. At the meetings where the landowners predominated, all the talk was about science, chemistry, and exhortations to exertion; but at the meetings of the farmers, the discussions had assumed a somewhat more practical shape. The farmers reason in this way:—"Agricultural chemistry and scientific farming are not what we want. We must have something else first. Don't let us be misunderstood; we by no means undervalue science as connected with agriculture. But what is the use of talking to yearly tenants about scientific farming, when we run great risks in undertaking even the commonest improvements? No; science is good; but there are some first steps towards its application to husbandry, which the landowners, and they alone, can render smooth and practicable for the tenants. There is the abandonment of game; the removal of timber and hedgerows; draining, or assistance to drain; additional and improved buildings; and before and above all, the grant of long and rational leases." This was the language of the farmers, and what they would like to hear something more of from the gentry at the great agricultural meetings. And in fact, to urge the farmers to apply themselves to chemistry, and so forth, before all these matters had been satisfactorily settled, was both idle and absurd. Moreover, it was as much for the landlord's interest as the farmer's that these points should be arranged, and that too with as little delay as possible. It was useless to contend that the initiative of improvement was with the tenant: it must be with the landlord. What said the *Mark Lane Express,* which he (Mr. B.) took to be a fair representative of agricultural opinions, upon this point? The *Mark Lane Express* said this:—

"The fashion of the day assumes that the remedy is in the power of the tenant; and he is accordingly recommended to expend more capital on the land, and to adopt the most improved system of management. We have always contended, and we still do contend, that the initiative is with the landlord: that the work of improvement rests principally with him, whether in regard to the permanent improvements which devolve upon him as landlord, or in placing the tenant in such a situation as to enable him to preserve his occupation with energy and security."

And this, he (Mr. B.) contended, was, in point of fact, the whole truth of the matter; and some of the best and more far-seeing landlords, and the proprietors best acquainted with agriculture, were beginning to see it in the same light. What said Mr. Philip Pusey, an extensive landowner, and one of the greatest practical agriculturists in the kingdom? At the last Smithfield Show dinner, Mr. Pusey is reported to have said:—

"I am now quite convinced that it is not so much the evil that the farmers do not know what to do, as it is that we, the landowners, do not allow them a fair opportunity of practising what they really do know."

They might depend upon it, the issue did not rest with the farmer alone. He was ready, as he (Mr. B.) believed, to do his part. But how was he backed by the landlord? Let them listen again to the *Mark Lane Express,* the Farmer's Advocate on this subject:—

"If such be the spirit in which the British farmer, tricked and deceived as he had been, is prepared to exert his energies in the pursuit of his occupation, and that he is met by his landlord in such a manner as the exigencies of the times require, who can form an estimate of the probable produce of the soil of the United Kingdom? We hear much of the necessity of stimulating the tenant farmers to increased exertion, of rousing them from their 'old jog-trot habits,' of forcing them to cast aside their antiquated prejudices; but what, we ask, is the extent of reform required of the tenantry as compared with the landlords? We have no hesitation in asserting that, taking the landlords as a body so far as regards the management of their estates, and the tenantry as a body so far as regards the management of their farms, the former are centuries behind the latter."

This he (Mr. B.) believed was strictly true. Nor were the landlords always fortunate in securing the most competent agents; but even the agents were far ahead of their employers, though often fearful drags upon enterprising farmers. The tenants were beginning to find out, that to be successful they must be secure of reaping where they had sown, and that they must attain social independence. Now this social independence—and without it no permanent success must be hoped for—could never be obtained so long as the tenant farmers were under the constant influence of the landlord or his agents, and more especially of the latter. These gentlemen he (Mr. B.) believed were for the most part—of course there were exceptions—an intelligent and high-minded class of men; but from the circumstances of their position, and from those circumstances alone, they could not be relied upon as the best and surest friends of the tenant. It was therefore incumbent upon the tenant to look well after his own interests, and to emancipate himself from a thraldom which was neither advantageous to himself nor to the owner of the land. Hear again what the *Mark Lane Express* says:—

"It is, however, gratifying to know that the tenant farmers are beginning to look into their real position, and that the relation of landlord and tenant will, beyond a doubt, be speedily better understood and better defined. We cannot concur in the opinion, that, in order to maintain a kind and friendly feeling between landlord and tenant, the latter must be kept in a state of dependence upon the former. In a primitive state of society, that species of connexion might be not only agreeable but useful to all parties; but to the tenant farmer of these times, the surest bond of friendship between himself and his landlord will be, a reciprocity of interests, and the recognition of his just rights, as well of position as of property. By the time that the question of 'tenant-right' has been discussed at the various Farmers' Clubs throughout the country (and we trust it will be in every one before the year 1846 has expired), we may hope that tenants generally will begin to understand the subject better, and that the landlords will see that instead of lessening the value of their estates, or decreasing thir legitimate influence, it will have a direct tendency to increase both."

And, as he (Mr. Brotherton) had before observed, some of the more intelligent landowners were beginning to acknowledge the justice of these sentiments. He had been much gratified by reading the report of a speech delivered by the Duke of Leeds to his tenantry at Auston, in December last. On that occasion, the noble Duke said:—

"He assured them that nothing should be wanting that lay in his power to make them happy and comfortable. It had always been the practice of his ancestors, as it was his, never to remove a tenant so long as he fulfilled the terms of his tenancy, and from this practice he should never deviate. But life was uncertain, and no man could say what would be done by his successors; he, therefore, as a security for their outlay, was ready to grant them leases whenever applied for; but at the same time he should advise them to withhold their applications for the present, as he was apprehensive that measures were about to be brought forward, which, if carried, would be injurious to the agriculturist; and if so, he gave them his firm assurance, that he would be one of the first to meet the times, and to ease the shoulders of his tenantry, by making a due proportion of the sacrifice himself."

In another portion of his speech, the noble duke had referred to the position of the labourer, and his dependence upon the farmer for employment. But with regard to this portion of the question, which had an intimate bearing on the branch of the subject before them, he (Mr. Brotherton) did not think he could do better than read them a portion of a speech delivered by Mr. Grey, of Dilston, the intelligent agent for the Greenwich Hospital Estates, at the late meeting of the Royal Agricultural Society, at Newcastle. Mr. Grey was called upon to speak to the toast of "The Labouring Classes of the Land." He said:—

"The man who is compelled to earn his daily bread by the labour of his hands cannot, in any material degree, alter his position and improve his circumstances in life. The employment upon which he depends for the support of himself and his family arises from sources over which he can exercise no control. He is dependent upon others for employment, and, therefore, he must look to others for the means of elevating himself and improving his condition. The tenant farmer, generally speaking, is the party by whom the agricultural labourer is employed; and much may be done for his benefit by the considerate kindness of his landlord. But then, again, the means which the tenant farmer employs, and the spirit with which he cultivates, most materially depend upon the terms upon which he holds his lands, and the encouragement he receives at the hands of his landlord. He depends on some one over whom he has no control, but who is also dependent on others, and must look to them for the means which will enable him to improve the labourer's condition. The tenant farmer is one to whom he must look; but then, again, the tenant farmer's resources, means, and subsistence, depend on the terms on which he holds his tenure from his landlord.

"No man can travel through this land without seeing that the condition of the tenantry formed a good test of the cultivation of the soil. Where the tenantry are poor and dispirited, the labourers are helpless and desponding; and in such condition of body and mind, neither the one nor the other will cheerfully till the ground. But, on the other hand, where we find the tenantry and labourers well fed and well clothed, their children not squalid, but clean and healthful, there we may conclude that the cultivation is good. Now, this cannot be the condition of that portion of the tenantry who occupy a large portion of the country as tenants at will and at annual rent. No system could put a more effectual check on agriculture or the spirited improvement of the soil than the system of annual rent and tenants at will. Two things are wanted to do justice to agriculture, namely, capital in the hands of the occupier, and knowledge to apply that capital in the tillage of the soil. For my own part, my experience of annual terms convinces me that they tend to make land unproductive, and to reduce the tenantry to a state of what I may call stationary ignorance.

"I admit that a good feeling between a landlord and his tenantry is a strong bond of union, and that reciprocal kindness of feeling between them would do much to promote and perpetuate their mutual good. But I would ask, Is it true that the feeling is more strong between the landlord and his annual tenant, than between the landlord and the tenant on lease, whose landlord is capable of appreciating improved cultivation, and to whom he will be prepared to give a fair preference when the time comes that his lease has to be renewed? The present is not the time to go into this subject as I should like to do, or I might easily show from cases within the circle of my own knowledge, that farms on leases have been continued through several successive generations, and that the rents have increased from £200 to £300, and from £300 to £700, and from 700 to £1,000, without any extra expenditure beyond the expense of the building, and none on the part of the landlord beyond what he would have to pay to a tenant on annual rents; while under a state of annual terms the farm would not have increased one-half. It is all very pretty in language and poetic in sentiment to say, that in the kindly feeling between landlord and tenant lies the best security that the farm would be perpetually occupied by the tenantry at will. But stripped of its sentimentality, what does it mean practically, but that the state of things under the father should continue to be the state of things under the son? The father was illiterate, and did not teach the son knowledge—rushes grew before in the ditch; they grow in the ditch still: the old house was patched and mended in the days of the father; it is patched and mended in the days of the son; and the same scanty crops are now reaped by the son, which the father and the grandfather reaped before his day. He certainly was of opinion that where there are tenantry at will, there the land is worse cultivated; and where there were leases, there it was best. Some instances there may be in which farms were well cultivated, and the tenantry comfortable, but these were exceptions, not the rule—generally, it would, I find, be under leases that the farmer would be disposed to lay out his capital, and feel himself most strongly disposed to improve the land. It may be all very well where annual terms exist, so long as the landlord feels disposed to assist him to cultivate the soil; but in this there was no solid security. No man would lay out his capital on it who thought well on the mutability of human affairs; and they all knew the fact that 'there did arise another king, who knew not Joseph.' Without the security of leases, all will be uncertain; and, until that security be generally given, the tenantry will not be in a condition to do justice to themselves and the labourers they employ."

Mr. Torr, of Riby, one of the judges, in a later part of the evening thus ably supported Mr. Grey's views, after referring to some of the uses of the exhibitions of stock and implements:—

"Still there is something beyond even these exhibitions—the prizes you dispense and the judges who are to award them—which is necessary to produce them; and with your leave, my Lord, I will tell you that capital alone can bring them. The time has now arrived when capital, whether in agriculture or manufactures, or in any art or science, must be the means of bringing forward every good and beneficial result. I mean capital well employed. I hold the argument, that if this capital cannot be supplied by the tenant, then, to a certain extent, it must be done by the landlord. It is self-evident that in many districts the tenants are not able, and in some they are not willing to supply the capital, and for very good reasons—because they have no certain prospect of a return."

And having expressed his concurrence in Mr. Grey's statements as to the necessity for leases—

"I am quite certain a new era is about to dawn on, I may say, the agricultural horizon, and that, in commercial principles, that labour which is the source of capital shall have its just reward, and the labourer be able to assert his independence. The labourers of England, in my recollection, have become much more independent in their station than they were formerly. I trust the independence of the tenant will be followed by that of the labourer."

The above extracts so clearly expressed his (Mr. Brotherton's) views upon this part of the case, and exhibited them in so much more forcible light than he should be able to do, that he should not attempt to weaken them by any additional observation of his own. He thought he had now established that without the security of a lease, the tenant farmer could not, with any show of reason, be expected to undertake any extensive improvements. The question now remained, What sort of a lease would answer the purposes required? And if they would permit him, he (Mr. Brotherton) would read them the draft of a lease which had recently been adopted by the Vale of Evesham Agricultural Association. It appeared that, about a year and a half ago, the Vale of Evesham Association passed a resolution, "That security of tenure is essential for the prosperity of the farmer, and will tend to the welfare of all other classes." Accordingly, a committee of landlords and tenants was appointed to draw up a form of lease, under which a tenant might hold his farm with the greatest advantage to himself, and with due justice to his landlord. The committee issued and extensively circulated a series of inquiries, addressed to agriculturists in all parts of England; and after due consideration of the answers obtained, they adopted the form which he (Mr. Brotherton) would now read to them. Of course it might be altered to suit any local circumstances which might render such alteration necessary.

"This indenture, made the day of one thousand eight hundred and forty in pursuance of an act to facilitate the granting of certain leases, between A. B. of of the one part, and C. D. of of the other part, Witnesseth—that the said A. B. doth demise and let the farm unto the said C. D., his heirs, executors and administrators, all the dwelling-house, buildings, and several closes of land mentioned in the schedule hereunto annexed, and containing by admeasurement A. R. P. or thereabouts, to hold from the day of for the term of twenty years thence ensuing; yielding therefore during the said term the rents hereinafter mentioned. Except and always reserved out of this demise all coals, mines, minerals, quarries of stone and beds of gravel, timber, and trees likely to become timber, with full liberty for the said A. B. his agent or others by him authorized, with or without horses, carts, or other carriages, to enter upon the said premises or any part thereof, for the purpose of working any of the said mines or quarries, or of felling or taking away the timber, or planting other trees, or for any purpose whatsoever; making reasonable satisfaction to the said C. D. for any injury or damage which the said A. B. may cause in so doing.

"1. And the said C. D. doth hereby for himself, his heirs, executors and administrators, and every of them, covenant, promise, and agree to and with the said A. B., his heirs and assigns, in manner following: that he the said C. D. will pay to the said A. B. by two equal half-yearly payments in every year, the first being made on the 25th day of March, and the other on the 29th day of September in each year, the following rents, that is to say, in the first year the sum of £ which sum constitutes the value of bushels of wheat according to the average price of wheat for the seven years ending on the 1st of January next preceding the date of this demise, made up and published as required by law for the purposes of the Tithe Commutation Act; and in every other year during the continuance of this demise the value of a like number of bushels of wheat according to the average price in like manner made up and published for the seven years next preceding; the rent for each year varying with the average price of wheat during the preceding seven years.

"2. And the said C. D. covenants with the said A. B. to pay all taxes chargeable upon the said premises during the said term, landlord's taxes excepted.

"3. And that the said C. D. will at his own proper cost and charge repair all the house and buildings hereby demised, and also will keep in good repair all the gates, rails, pales, stiles, hedges, ditches, fences, banks, bridges, mounds and drains on the said lands, the said A. B. his heirs and assigns furnishing on the said premises or within miles thereof all rough timber, brick, lime, tiles, and all other materials whatsoever for making such repairs.

"4. And that the said dwelling-house and other buildings having been valued by persons of skill at the entry on the said premises by the said C. D. at the sum of £ which valuations are included in the schedule hereunto annexed, the said C. D. shall and will at the expiration of the said term, or at the time of his leaving the said premises, whether it be before or after the end of the said term, deliver up to the said A. B. all the buildings so valued in good repair, and shall and will pay to the said A. B. the whole sum by which the said buildings shall have become lessened in value by reason of his neglect to repair the same; and in case any dispute shall arise with respect to the decreased value of the same, such dispute shall be referred to the decision of two arbitrators or their umpire, chosen as hereinafter provided; but the said C. D. shall not in any case be liable for any damage caused by tempest, and a reasonable deduction shall be made for the natural decay and wear and tear of the premises while occupied by him.

"5. And that the said C. D. shall not sell or assign over this lease, nor underlet the lands hereby demised or any part thereof, unless with the written consent of the said A. B., and shall use his best endeavours to protect from injury by cattle or otherwise all trees or quickset hedges growing upon the said lands, and shall not lop or cut any of the trees so growing, pollard trees excepted.

"6. And it is hereby agreed that at any time in the sixteenth year of this demise, or in any subsequent year, the said A. B. may require the said C. D. to grow such crops on every portion of the said lands as shall be prescribed by the said A. B., he the said A. B. delivering in writing to the said C. D. the course of cropping prescribed by him; and in case the said C. D. shall object to crop the land as proposed by the said A. B., the point in dispute shall be referred to the decision of arbitrators or their umpire, chosen as is hereinafter provided.

"7. And that the said A. B. shall at all times have power for himself, or his agent, to go upon any part of the said demised lands for the purpose of inspecting the state of repair of any part thereof, and of ascertaining the state of the management and cultivation thereof; and in case the annual renting value of the said demised lands shall have suffered decrease by reason of the said C. D.'s failing to repair or to cultivate the said lands according to the rules of good husbandry, the said A. B. may give notice to quit to the said C. D. at any time before the 25th day of March in any year, and the said C. D. shall quit and deliver up possession of the said lands on the 29th day of September next ensuing after such notice has been received by him; and in that case arbitrators, or their umpire, appointed as hereinafter mentioned, shall assess the damages to the land and buildings caused by such breach of covenant, which sum so assessed the said C. D. shall pay to the said A. B. And in case the said C. D. object to quit after receiving such notice, he may require that the dispute shall be referred to arbitrators or their umpire, chosen as hereinafter provided; and if they shall decide that the said lands have not been materially deteriorated by the management of the said C. D., such notice shall be void; and if they shall decide otherwise, the said C. D. shall quit, and shall pay to the said A. B. whatever sum the said arbitrators, or their umpire, shall judge to be a reasonable compensation for the injury done to the said lands by the said C. D.

"8. And that in the event of the said C. D. becoming a bankrupt or insolvent, or of his making any bill of sale or assignment of his estate or effects, or refusing to pay in full the rents herein reserved within one month after the same shall have been lawfully demanded, the said A. B. shall have power immediately to re-enter and re-possess the lands herein demised, paying to the said C. D. reasonable compensation for such improvements effected by the said C. D. as have increased the annual renting value of the said lands, the amount thereof being adjudged by arbitrators, or their umpire, chosen as hereinafter provided.

"9. And the said A. B. covenants with the said C. D. for quiet enjoyment of the herein demised lands; and that the said A. B. shall insure all the buildings upon the said premises, provided always that in case such insurance shall be rendered void by the said C. D. having on the premises goods of a hazardous nature, or by other circumstances caused by the negligence of the said C. D., he, the said C. D., shall pay to the said A. B. the whole amount withheld by the insurance-office.

"10. And that the said A. B. will effectually drain at his own cost and charge every part of the said lands which require drainage; and that the said C. D. covenants to pay an additional rent after the rate of 5*l.* for every 100*l.* expended by the said A. B. from the time of the completion of the whole or any part of the drainage, and during the continuance of this demise.

"11. And that the said C. D. shall and will, during the time he holds the said lands under this demise, farm them in a good and husbandlike manner, and shall not break up or convert to tillage any of the land marked in the schedule annexed as pasture or meadow land, without the written permission of the said A. B., or of his agent lawfully authorised.

"12. And the said A. B. and C. D. mutually covenant and agree that any dispute arising in settling their respective claims in respect to any matter contained in this demise, as well as the several matters herein declared to be referrible to the decision of arbitrators, shall be settled and decided by persons of skill, appointed in the following manner:—That is to say, the said A. B. shall choose one such person, and the said C. D. shall choose another, to be arbitrators, who shall, upon being appointed, forthwith choose an umpire, whose decision, in case the said arbitrators disagree, shall be final. And should either the said A. B. or the said C. D. refuse or neglect to choose his arbitrator within a month after being required to do so by the other, then either the said A. B. or the said C. D. shall have power to choose and appoint two arbitrators, who shall decide by themselves, or their umpire; and such decision shall be equally binding on both parties as if each had appointed one arbitrator.

"In witness whereof, these presents written on this and the preceding pages, are subscribed by the said parties at , in the county of , and in the presence of——"

[Mr. Brotherton then proceeded to comment on the above lease at considerable length, pointing out various objections, but at the same time placing it in favourable contrast with some recent agreements which had been put forth, as we believe, on a neighbouring estate. Our space, however, will not permit us to give Mr. Brotherton's observation on this point].

Mr. BROTHERTON then resumed as follows:—I have now, very imperfectly I admit, though at much greater length than I had at first intended, gone over the various branches of this important subject, to which I told you, at the outset, it was my wish to direct your attention. I am aware that some of the sentiments I have expressed may not be popular in high places, but this gives me little personal concern. If I shall have been in any degree instrumental in fixing your attention upon evils which exist, and which you may be therefrom induced to co-operate to remove, I shall be abundantly satisfied. I have shown you that you must rely on yourselves. The issue rests with you, and you alone. And remember, that two of the principal elements of success in any undertaking, whatever it may be, are, first to have the spirit and intelligence to see what ought to be done; and, secondly, to possess the faith to believe that what ought to be done may be done. With this conviction you will triumph over every obstacle which may present itself in your path. And, gentlemen, from the removal of the restrictions to your trade, to which I have this evening adverted, and from the free scope to the enterprise, energy, and intelligence which I hope, ere long, to see the British farmer enjoy, I do confidently anticipate that a brighter day is about to dawn upon our agricultural pursuits, than, from the late changes, many of us have been led to anticipate. As your intelligence and skill are brought to bear upon your pursuits, you will now see you have nothing to fear from foreign competition. You will perceive the truth of the axiom, that "the world is large enough for us all," and that, if unfettered by restrictive laws, honest industry will ever meet with its just reward. You will cease to look upon the nations of the earth with the eyes of jealous rivalry, and be led to a better appreciation of that Christian sentiment which proclaims that "all mankind are brothers." You will then be better able to comprehend, in the language of an eloquent statesmen, the wisdom which divided this globe into different zones and climates; why it is that different countries yield different poductions to people experiencing similar wants; why it is that they are intersected with vast rivers, which are the highways of nations—nay, why it is that they are brought almost into contact by the very ocean which seems to divide them. You will see that all these things were designed that man should be dependent upon man; that commerce should freely go forth, leading civilization on the one hand, and peace on the other, multiplying and confirming our friendly relations with the nations of the earth, and rendering mankind wiser, happier, better. You will believe that this is the dispensation of Providence—the decree of that Power which created the universe—and that it was never designed that the hand of presumptuous man should dare to interpose the laws of artificial restriction between the rights of labour and the gifts of God. You will see in your own occupations a means of extending benefits to mankind at large. Your prejudices will be uprooted—the furrows will be deepened, and the subsoil exposed to the purifying influence of advancing intelligence and enlightened science, till at length you will attain a position which will secure honour to yourselves as a class, and advantage to the country at large. (Mr. Brotherton resumed his seat amid loud cheers).

The meeting was afterwards addressed by Mr. Wright, Mr. Bacon, the Secretary, and other gentlemen.—Derbyshire Chronicle.

WEST HEREFORDSHIRE FARMERS' CLUB.

TESTIMONIAL TO MR. TRETHEWY.

The members of the above society having resolved to present their vice-president with some testimonial of their regard and esteem upon leaving the county, commenced active operations for that purpose; and in the short space of a few weeks the needful was raised, and a splendid breakfast service had arrived at their club-room, at the Lion Inn, Bredwardine, which on Friday, the 18th Sept., was presented to him at a dinner for that purpose, by their worthy patron and president, Colonel Powell, of the Hardwick, who filled the chair on the occasion. Notwithstanding the notice being so short, by the hour of four o'clock a goodly sprinkling of friends from this city and the town of Hay, and almost every member of the club, were in attendance to do honour to their respected guest; and most happily did they succeed in their praiseworthy object, for never was a testimonial more worthily and nobly presented, or more gratefully received. Letters were read from the Vicar of Dorstone, and several other friends, regretting their inability to attend, and expressing their esteem and regard for Mr. Trethewy.

Due justice having been done to the bountiful and excellent repast, and the cloth removed, the usual loyal toasts were given from the chair, followed by " Sir Velters Cornewall, Lady Cornewall, and the House of Moccas." This toast being loudly cheered,

Mr. TRETHEWY rose and said—I have frequently had the pleasure of responding to this toast in this room and before most of the present company; and I am very happy in having the opportunity of doing so on the present occasion. It is a toast which has always met with an enthusiastic reception from those present, and I hope you will have many more opportunities of testifying your regard for the house of Moccas (loud cheers). I have had the honour of serving that family for the last eight years, and I feel proud of the distinction (loud cheers).

The pieces of plate were then severally brought in and placed before the president, amid thunders of applause, which continued for some time; when it had subsided,

The gallant Colonel rose and said—Gentlemen, I regret to have been called upon to discharge so important a duty as the one which this evening has devolved upon me; because I am fearful I shall not be able, in appropriate terms, to convey your good wishes towards our most excellent friend, Mr. Trethewy, nor be able, I am afraid, to do him justice; that I shall not be able to speak of the many excellent qualities of his head and heart in a manner they deserve to be spoken of (Hear, hear). I have a consciousness also that I shall not acquit myself with credit or, I much fear, to the satisfaction of this numerous and respectable meeting. But regret vanishes, and pleasure is the predominant feeling in my mind, on seeing so deserving an individual as our excellent friend, Mr. Trethewy, about to receive from my hands a token of that respect, confidence, and esteem, in which he is held by every one who has the pleasure of knowing him (loud cheers). I have had the good fortune to enjoy his friendship for a long time; and I am bound to say that in sterling honesty of purpose, integrity, and uprightness of conduct, he cannot be surpassed (great applause). Success has smiled upon his schemes and crowned his labours (cheers). As an agriculturist he is pre-eminent; we have individually and collectively had ocular demonstration of his ability as a scientific and practical agriculturist. This neighbourhood is particularly indebted to him for the example he has invariably set us, of useful, practical farming. [Then turning to Mr. Trethewy]—If proof were wanting, sir, on your quitting this county, that you took with you the good wishes of all, the splendid breakfast service of plate, which I have now the pleasure to present to you, will be sufficient testimony of the confidence, respect, and esteem, not only of every member of the West Herefordshire Farmers' Club, but of a very numerous body of other friends. I will now call upon the secretary to read aloud the inscription.

The **Secretary** then read the following inscription, which was received with great applause :—

> Presented to Mr. **Henry Trethewy** by the Tenantry of the Moccas Estates, the Members of the West Herefordshire Farmers' Club, and other friends, as a mark of their regard and esteem.—Sept. 18th, 1846.

The gallant **Chairman** then proceeded—Now, sir, on behalf of the members of the West Herefordshire Farmers' Club, I have the pleasure to present you with this valuable breakfast service of plate, as a mark of their affection and esteem. There is at the same time an amalgamation of feelings in my breast of the most opposite extremes of human nature, pleasure and pain—pleasure in being the medium of conveying to you this signal mark of the good wishes of your friends ; and pain, at its being, in all human probability, an everlasting severance between us (Hear, hear). May you, sir, in your new locality, have the good fortune to meet with the same unsophisticated, honest, kind-hearted, good sort of friends you will leave behind you. (The gallant chairman resumed his seat amidst deafening applause.)

Upon Mr. **Trethewy** rising, evidently much affected, he was greeted with the most enthusiastic cheering. He said—Col. Powell and gentlemen,—I have never risen to speak under circumstances at once more difficult and more pleasing, than those under which I now rise to address you. I feel myself quite incompetent to express the very sincere thanks which I feel I owe to you. I do not come here prepared with a set speech, but I rise to speak the impulse of my heart (Hear). For the kind and feeling manner, Colonel Powell, in which you have been pleased to introduce my name this evening, you are entitled to, and I beg humbly to tender you, my heartfelt thanks. But I cannot but declare that I do not feel myself deserving of the very high compliments you have been pleased to pay me (Yes, yes). To you, gentlemen, who have been so kind as to cause this very handsome present to be placed on the table this day, I feel it extremely difficult, nay, impossible, to say how very much I value your kind act and generous feelings (cheers). It is not the value of the plate, splendid as it is, that I esteem, but the circumstances under which it comes into my possession, and the by-gone associations which will ever be connected with it (great applause). I value this testimonial, gentlemen, more than anything I am possessed of. I came into this county, but a few years since, a perfect stranger ; I knew not an individual in it. But, gentlemen, the kindness and good feeling which I invariably met with have had the effect of attaching me very warmly to it, and especially to this neighbourhood (loud cheers). I have met with nothing but kindness in Herefordshire, and I should be guilty of the greatest ingratitude if I did not acknowledge it and thank you very sincerely for it. [Mr. Trethewy was here deeply affected ; but shortly proceeded to other subjects mentioned in the gallant Colonel's address.] He disclaimed the very high enconiums passed on him as a farmer ; he did not merit them. There were men in that room more entitled to them ; but there was no man who took a warmer interest in agricultural pursuits than he did. He had taken great interest in the West Herefordshire Farmers' Club, and he rejoiced to see it prosper ; and he begged thus publicly to thank Colonel Powell for the countenance and assistance he had given it (cheers). The club had been the means emulation among the occupiers of land in the neighbourhood ; and wherever such emulation could be excited, success in their undertakings would be sure to be the result. It was a credit to ambition in any man to try to farm better than his neighbour (cheers). It was this feeling, to a great extent, that had brought the manufacturers of England to their present high position ; and he felt sure it would do much for agriculture. He again expressed his warmest thanks for the substantial testimonial of their feelings towards him, and sat down amidst much applause.

Mr. T. **Cooke**, in a highly complimentary speech, replete with kind feeling and good humour, proposed the health of Colonel Powell, which, after being duly honoured in the way the friends of the gallant Colonel are wont to greet this toast, was feelingly responded to.

The **Chairman** then gave "Success to the West Herefordshire Farmers' Club," coupling with it the name of their hon. sec. and treasurer, Mr. J. Mathews, who was, he was delighted to see, occupying the vice-chair upon the present joyous occasion.

In responding to the toast, which was received with great applause, Mr. **Mathews** said—Colonel Powell and gentlemen,—From my heart I sincerely thank you for the very high compliment you have just paid me ; but much and highly as I appreciate that compliment, I assure you that I feel much more gratified in joining you on the present occasion to do honour to my worthy friend, Mr. Trethewy (loud cheers). I think I may call myself one of his earliest Herefordshire acquaintances ; and I look back with pleasure and satisfaction to the many social hours I have passed in his society (cheers). I frankly confess that I do feel much regret at the separation about to take place (Hear, hear) ; but, gentlemen, that regret is tempered very much by the pleasure of knowing that he is about to take with him, into another country, such a lasting memento of our respect and esteem as the one now before him (loud cheers). From the experience I have had of Mr. Trethewy's zeal and ability, I doubt not that ere long that part of the county of Bedford to which he is going will re-echo back to us similar sentiments to those I have now faintly endeavoured to express (immense cheering). Mr. Mathews then gave as a toast " The Committee of gentlemen who promoted and undertook the task of collecting the funds and selecting the articles for the testimonial," which had done them credit and honour (loud cheers).

A Member of the Committee briefly acknowledged the compliment.

The conviviality of the evening was kept up with an alternation of toast and song till a late hour, all endeavouring, with a worthy ambition, to exceed each other in expressions of regard for their estimable guest.

We understand the testimonial was manufactured by Savory and Co., London, and was much admired for its chaste and elaborate workmanship.—Hereford Times.

GUILDFORD FARMERS' CLUB.—THICK AND THIN SOWING.

The following sensible remarks were made by Mr. Evershed at the last meeting of the farmers' club:—

Each of the several modes of planting grain has its merits and demerits. Broadcast, though not exploded, is very much curtailed within the last few years, and is, I think, going more and more into disrepute. It is resorted to by the advocates of the drill, at certain times, either for expedition, or to avoid disturbing the solid furrows in a wheat preparation, or to prevent undue treading for barley in adverse seasons. Many heavy, cold, tenacious soils are considered to be better managed by these means than by any other. Some recent experiments made, give a preference to broadcast over the drill. It appears to me that the drill has justly obtained the pre-eminence in public estimation. It may be used upon almost all soils, perhaps upon all—a merit that cannot be claimed for the dibbler. It deposits its seed at an equal depth and at even distances. Equality of depth ensures the same period of germination, produces the young shoots of the same age—which is a certain advantage—and the clear intervals between the rows give free scope for the hoe. It is believed that the influence of the atmosphere—its carbonic acid gas—acting uninterruptedly between the rows of corn, produces corresponding benefits. Dibbling wheat under certain circumstances is a very useful process. The lightest sands appropriated to the growth of wheat, are frequently infested with weeds, particularly the poppy. It is very difficult to eradicate that noxious and troublesome weed Hand-weeding in the rows of drilled wheat is slow and expensive. In dibbled wheat a much larger surface is afforded for the hand hoe. Rows of drilled wheat cannot be hoed, but rows of dibbled can all be hoed with the exception of that part containing the dibbled bunches of the growing corn: this I consider a great advantage. The poppy, like charlock, appears on some lands indestructible; but by these means it is much and more readily abated. Dibbling may be advantageously used on porous soils—or soils rendered loose by the late withdrawal of root crops—mangel wurzel for instance. It often occurs that, late in the year, it is impossible to approach the land from continued rains; the dibble may then be employed to great advantage—the rake following at the cost of about 2s. 6d. per acre; the grain is thus planted and the field becomes green before the frosts have arrived. Land that is too wet to drill in a late wet season, frequently remains so, and the opportunity to plant it is lost; but dibbling in cases just alluded to may be done almost with impunity. This remark does not apply to soils so adhesive as to hold water in the cup that the dibbler makes; where such is the case the grain will surely perish; I speak of porous soils, which, though wet from recent rains, the water escapes from rapidly, leaving the seed to germinate, grow, and flourish. I dibbled upwards of thirty-five acres last autumn, upon lands which I could not drill, from the 8th to the 22nd of November. The preceding crops were beans, peas, mangel wurzel, and potatoes. Five pecks of wheat of good quality, but of small size, were used per acre. It was raked in, and a mild season following, it quickly vegetated, and did not lose plant. Those parts of the fields which were planted thickest were decidedly the most productive both of straw and grain. I dibbled sixty acres of wheat in the autumn of 1842: the former part of the season was too dry, and the latter part too wet: fields that were in the desired condition to deposit the seed became too dry or too wet, before they could be finished; the process was too slow. Even on a lightish hazel mould, hasty and heavy rains following the dibble before it was possible to harrow, the seed perished in the cups, to a great extent: this dibbling was done by hand dibblers upon leys. No attempt was made to rake the ground, on account of the general solidity of the furrow. When the ground was too dry, during some part of the season, the holes were too shallow in the hard surface to secure the seed. The thickest parts of the field were best. Dibbling, then, on a large scale, I think, is dangerous in wet and variable seasons. Another objection arises from the little dependance to be placed on the persons employed—particularly the children: some exceptions are to be found, but there is much hazard where so much is at stake. I have never dibbled barley; but oats, beans, and peas I have severally tried with various success. In certain circumstances—where the poppy is apprehended in wheat, or where the lands are peculiar, so that the drill cannot be introduced and the horse cannot step—this process may be employed to advantage. If it ever becomes general, I think it must be done by machine; this is the only means by which the seed can be deposited in the soil when it is fit to receive it. The quantity of seed required varies exceedingly, as before noticed. Broadcast is subject to most waste, and therefore requires most seed. There is little waste to either of the other processes. The drilled acre, I think, wants somewhat more seed than the dibbled, and principally on account of the proximity of the seed of the latter, which nurses and protects and forwards it. No prescribed quantity of any of the varieties of grain can be recommended as applicable to all lands on all occasions. That amount which in the majority of years succeeds best should be adopted. Notice must always be taken of the bulk and quality of the grain: if small, but perfect, less will suffice; if cold and defective, more is of course required. 12 pecks per acre of good wheat in some cases is not too much, while five pecks per acre in others is not too little. If all the seed deposited in the earth grew and lived, about an equal quantity would be required on all lands of equal quality and condition, whatever the previous preparation might be, whether certain chalk leys which require the most, or fallows which demand about the least.

The improvement which has obtained in securing grain within the last twenty years, by which we gain a sounder and better seed, renders a somewhat smaller quantity necessary for planting: further than this, any attempt to economise the amount of seed is not by farmers generally considered desirable. Different opinions prevail. Lord Western advocates thick sowing; on the presumption that no tillering should be depended upon; he pursued the principle, and, as he believed, proved it by many successful experiments. In the present day there is a disposition very prevalent for thin sowing, and an excess of tillering: reports are current of the efficacy of the modern plan. I fear we do not hear the whole truth—we are informed of success and not of defeat. I have the best authority for saying, that, on a farm in the eastern part of Surrey, reputed for thin sowing, many acres of corn are ploughed up from time to time, of which the public is left in purposed ignorance.

It is related that a farm in Yorkshire remained for a time untenanted, a prejudice against it having obtained, one of the grounds for which was that the oats would not ripen. A tenant was at length found, who at once corrected the evil, by sowing an additional quantity of two bushels of oats per acre. Opinions will be unanimous as to the fact, that thick crops of straw ripen earlier and better, and produce a grain superior in quality to thin ones, the latter of which sometimes do not ripen at all. The atmosphere appears to act too powerfully upon isolated straws, and upon the current of juices forced into the stalk. I do not assume that thin planting must necessarily produce thin straw crops, but it does not so certainly secure a crop of the desired thickness. If we sometimes find our crops unduly thick, the loss we sustain is much less, upon the whole, than in the case of a crop unduly thin; the first destroys the weeds and ripens well, the last encourages them, and blights or mildews. Every farmer should strive to be a judge of the quantity of seed necessary for himself. Some districts require more seed than others; he will vary his quantity, and also his distances between the rows, according to his land, the poor soil requiring closer rows than the rich. He will measure his quantity by his preparation for it; whether succeeding ley, or fallow, or peas; the last of which is injured by much seed. The seed of the last few years has been superior, and should not be allowed to determine the quantity in adverse years. A succession of wet harvests would convince us that a more liberal quantity would be required than we think necessary at present.

TENANT'S RIGHTS.

Sir,—I am at a loss to conceive on what grounds your correspondent, Mr. Cave, expects me to answer the questions he has *twice* urged upon me in your journal. My letter to which he alludes referred almost exclusively to *glebe land,* and certainly did not pretend to suggest an *ex post facto* remedy for all the evils which have arisen under the defective provisions of the law, as it now affects landlords and tenants. My suggestions related only to the future. I should be sorry, however, to disoblige Mr. Cave, and, therefore, as regards the case of his friend No. 1, who expended his money on the faith of a rotten lease, and thereby lost it, I would say that he is one of those multitudes who through ignorance or inadvertence stand committed to a bad bargain, and the only advice I can give him is, either to employ a more expert lawyer, or to retire from business till the Millennium, when it is to be hoped he will be able to manage his own affairs without any such assistance, or will escape the penalties which in the world as it is now constituted are almost invariably the consequence of such folly as his appears to have been.

As regards Mr. Cave's other friend, No. 2, who is said to have been discharged from his farm for marrying a Dissenter, the question is far more delicate and difficult, and he must see how dangerous a task it is for me to offer advice when "a lady is in the case." His landlord probably was well aware that the all powerful influence of the young bride would now be brought into action in order to render her husband indifferent, if not hostile, to the interests of the Church of which he was a member when he entered upon the farm, and dreading that petticoat interference, he preferred another tenant on whose independence he could rely. I own I sympathize with him in his fears. Mr. Cave will have seen by my former letter, that in my opinion a tenant ought to have such security as will protect him (whether he marries a Churchwoman or a Dissenter) from being discharged without compensation for all expenditure of which he has not had time to receive the benefit. Let landlords and tenants lay their heads amicably together for the purpose of getting some legislative enactment to that effect; and in the mean time, till this is accomplished, let Mr. Cave give a quiet hint to his friend, that if he should ever have to look out for a second wife as well as a second farm, he had better choose a decided and conscientious Churchwoman, for he may be assured that even if his landlord leaves him undisturbed, he has little chance of domestic peace so long as his own religious principles and his wife's are of a conflicting tendency. No "compensation" that I am aware of can ever be devised for so ill-omened a union. Mr. Cave knows the evil of putting a pair of horses that do not step well together into the same plough-team, but the folly of this is trifling when compared with that of a Churchman who yokes himself to a Dissenting wife.

I am, Sir, your most obedient,

Cranford, Sept. 14. George S. Robinson.

Sir,—Permit me to make a few remarks on the questions proposed by Mr. Cave. It appears to me very desirable that both politics and religion should as much as possible be excluded from the question of tenants' rights: nothing but ill-feeling will be the consequence of their introduction into the question; and there is no necessity whatever that they should be a matter of debate. Landlords have rights—and tenants have their rights; and when both have a clear perception of what is legally and what is equitably right, much will be gained by both parties.

A landlord then has the legal right and the equitable right to let his land on lease, or by the year; he has, too, the legal right to sell his land at any time to any individual who may wish to purchase it for the purpose of occupation. He has the right, too, to take it into his own hands whenever the lease expires, or when legal notice has terminated. The tenant has his legal right to occupy till the end of his term; he has, too, the right to quit, on proper notice, whenever it is to his advantage to do so. A yearly tenant is a tenant "at will," that is, it depends altogether on the "will and pleasure" of his landlord how long he shall occupy the land; so that whenever the landlord is dissatisfied with the tenant, whether it be because he marries or refrains to marry, whether it be because he is Whig or Tory, Churchman or Dissenter, or whether it be because he does not please him in the cultivation of his land, he has the legal right to terminate his connexion with his tenant; and the tenant has the legal right to do the same if he dislikes the politics or religion, or the mode of cultivation required by the landlord.

It appears, however, that there has been a lease that was not equitably drawn up. Doubtless there are many such, but tenants should carefully examine them when executed; that is the time, and the only time, to see that their legal and equitable rights are secured; and if they will let that time slip, they must take the consequences of their neglect of duty to themselves and to their families. The law can provide no remedy for such neglect. All the leases I have ever seen have been anything but equitable. But while tenants will enter upon the land on any terms, how is the evil to be remedied? To exhibit to the public view of the occupiers of land a lease well drawn up, and discuss all its clauses seriatim at their friendly meetings, would perhaps do much to remove difficulties out of the way.

With respect to the other case mentioned by Mr. Cave, of the yearly tenant having expended large sums without any lease, if it be a fair representation of the matter, it was, to say the least, a very imprudent mode of proceeding. He depended upon honour, not upon law—"honour," therefore, is his only remedy. Perhaps, moreover, the landlord might turn round and say, "It is very true my land is much better than when you commenced your tenancy; but I could have let it on a lease for the time you have had it, at the same or greater rent, with an engagement on the part of the tenant to make all the improvements you have done. If so, what equitable claim have you on me?" Moreover, can the landlord now let it on the same terms for a lease, on condition that the tenant should expend as much on permanent improvement as the late tenant has done?

It is a maxim held in courts of justice that every man is bound to know the law. People that are ignorant must always be liable to loss: no government, no laws, can prevent it: it is an ordinance of Providence which cannot be altered. When a person enters upon a farm, and begins to expend a considerable portion of his capital, it is a duty to himself and to his family to have legal security for his outlay. His landlord may be an honourable man; but he may die to-morrow, or he may sell his estate, and the incoming landlord buys the land as it now is, not as it was twenty years ago. The tenant should provide for the contingencies before he expends his capital. The controversy about rights, if carried on with temper, cannot fail to do good. Society is making rapid strides, laws are growing obsolete, and fresh ones are required to meet the new circumstances of the country. Children want clothes that will fit them, but every year they want a new fit. So it is with laws: they cannot be eked out fast enough to fit the growing community. But legislation cannot meet all cases: there must, after all, be a wide field which that cannot touch. There will be an undefined territory which nothing but the growing intelligence of the community can equitably divide between the landlord and the tenant. In proportion as tenants are men of principle and intelligence, they will, they must have rights; and it is impossible to secure the rights of those who are not so. When tenants are men of intelligence and high moral principle, all improper interference about politics and religion will die a natural death. It is only while some parties are willing to crawl that others will expect to ride.

I am, Sir, your obedient servant,

O. P. Q.

—Northampton Mercury.

GOVERNMENT PROVISION CONTRACT.

The following were declared contractors at Somerset-house, London, on Thursday last, and at the annexed prices:—

PORK.

M'Swiney............	10,000	Tierces, at	£7	3	10
Ditto	4,400	....	7	16	6
J. and T. Nesbitt	3,000	....	7	14	6
Barclay and Co.	600	....	7	12	0
	18,000				

BEEF.

M'Swiney	3,100	Tierces at	£7	5	7
J. and T. Nesbitt, London	2,900	....	7	5	6
Baker, London	600	....	6	15	0
Smith, Dublin	500	....	7	0	0
Jones, Brothers, London	300	....	6	19	3
Burke, Cork	300	....	6	16	10
Barclay and Co.........	300	....	6	16	0
Not taken	4,000				
	12,000				

The above rates are 20s. per tierce for pork, and 17s. per tierce for beef over last year's contract. Mr. John Russell, of Limerick, tendered for the entire of the pork contract at £8 4s. 9d. The principal contractors, M'Swiney, a London and Cork house, had the contract last year.

Annexed is a statement of the quantities made up, and the prices at which taken, for the last four years:—

1842.

Beef, 15,000 tierces taken at	£7	1	9	to	£7	3	10
Pork, 16,300 .... at	7	2	10	to	6	4	4

1843.

Beef, 600 tierces taken at					3	18	5
Pork, 600 .... at					3	15	10

1844.

Beef, 3,000 tierces, taken at	5	4	3	to	5	6	10
Pork, 11,000 .... at	5	11	3	to	5	14	0

SUPPLEMENTAL CONTRACT.

Pork, 1,000 barrels, taken at	3	19	4
Beef, 2,000 half-barrels, at	1	19	3

1845.

Beef, 8,000 tierces, taken at	6	0	0	to	6	14	0
Pork, 14,000 .... at	6	3	0	to	6	17	10

The prices of singed pork for these years were in the month of September as follow:—

1842	36s. to —s.	per cwt.
1843	26s. to —s.	„
1844	36s. to 38s.	„
1845	45s. to 46s.	„

ON THE ADVANTAGES OR DISADVANTAGES OF BREAKING UP GRASS LANDS.

BY MR. THOMAS ROWLANDSON, LIVERPOOL.

The subject which heads this paper has ever been little understood, though undoubtedly the most interesting and important question pertaining to agriculture. The changes which have recently taken place with reference to the future protection of home-grown agricultural productions, have given this matter a degree of importance which will press the same with the most intense interest on the attention of all connected with agricultural pursuits. The subject is a difficult one, on which it was well said by the late Mr. George Sinclair, in his invaluable work, the "Hortus Gramineus Woburnensis," "that the comparative value of permanent pasture and tillage is a subject out of the reach of the humble narrator of facts; yet, after all, pasture-land and tillage-land are so mutually dependant on each other, and the community on both, that the question which of the two is the more valuable, and to be encouraged in preference to the other, for private or public advantage, can never receive an absolute answer; for the various local circumstances of soil and climate under which lands may be situated, also the fluctuations in the demand for particular farm-produce, caused by every temporary change in the political state of the country, make it impossible to obtain data on which to ground a clear and satisfactory answer to the question, and which shall be found to be correct under every circumstance." No man ever had, or perhaps ever will have, the opportunity of judging the relative properties of the different grasses equal to that possessed by Mr. Sinclair. His work, already named, is the most valuable text-book on the subject extant. I may venture further to add, that it is immeasurably the most valuable practical work that has ever been published on agricultural subjects, and no farmer should be without having it in his possession. All that has been written respecting grasses, since its publication, and the various recipes given for the purpose of laying down land for permanent pasture or alternate husbandry, have been copied from the work alluded to, or with some slight alteration (which is invariably for the worse), made to hide the plagiarism. This essay is not intended for a dissertation on the grasses, the cultivation of which is inseparably connected with the subject. In order, however, to prevent long dissertations, when necessary I shall refer at once to Mr. Sinclair's or any other work for proof of what I may assert, but which I deem unnecessary here to dilate upon; which would also have extended the paper to undue bounds, and probably have led the reader into confusion.

No plan occurred to me so well adapted to exemplify the subject, as a debit and credit account of the probable returns and expense of an acre of land during a series of years; also showing the relative cost of seed, labour, &c., distinguishing manual from animal labour. I have assumed 50s. per qr. as my data for the price of wheat, being firmly convinced that such will be about the price of wheat in consequence of the changes which have recently taken place in the corn-laws. If too low, it will be obvious that the difference in value will be in favour of the alternate husbandry. On inferior soils, I have taken the average value of wheat at 2s. per qr. lower, viz., 48s. The estimated crops are probably higher than the average throughout the kingdom; nevertheless, they are crops obtainable on land such as is described. They are such as I and others have obtained, and can also be grown by any one without a very extraordinary outlay in manure. On exhausted lands, ruined by scourging cropping, the case is not applicable, as on such an extra outlay will be required. The land on which the following data are taken is presumed to be in good heart, and is expected to be left so at the close of the rotation. The sum set down to each crop on account of manual labour is assumed to be an average of the kingdom: each may probably find it somewhat different in his own district or peculiar circumstances. On examination, however, I believe it will be found a near approximation to the average amount paid in the *purely agricultural districts* of the kingdom. The most difficult part of the question has been the due apportionment of the respective values of green crops; for such I have no data on which to found an opinion which may emphatically be stated as correct. I have sought information by perusing a variety of agricultural reports, as well as several experiments instituted through the instrumentality of the Highland and Agricultural Society, but all are deficient on some one or other important point of information, which has left the matter *in statu quo*. By comparing the well-authenticated experiments alluded to with each other, and adding thereto the results of my own experience, I am induced to think that the values of the various green crops, as herein set forth, are about their true worth to the farmer for home consumption, and nearly agree with their usual estimation amongst farmers. The grain crops are at the presumed market price, leaving only the straw for manure.

It is highly requisite that some data be taken on which the calculations relating to this subject are based. In doing so I have taken two data as my standards to reduce the respective values of green crops into money. The first is by reducing the feeding properties of different green crops to the value of hay as a standard. The second is calculated from the tolerably well-ascertained facts as regards the feeding powers of hay; the quantity of meat thus produced being valued at 6d. per lb., will reduce the various crops to a money, and therefore easier understood, value. In districts where grass is plentiful, and where farmers not unfrequently fatten cattle on hay, it is found that a bullock of 50 stones weight will consume 40 lbs. of hay daily, and will put on flesh at the rate of 2 lbs. per day: valuing the meat at 6d. per lb., it would make the hay equal to £2 16s. per ton, besides the value of the manure. It is further found, that a bushel of potatoes, with 10 lbs. of hay, will produce the same result. This would make 5 stones of potatoes, or 70 lbs., equivalent in feeding properties to 30 lbs. of hay; at which rate 15 tons of potatoes would be equal to 14,400 lbs. of hay, or within 40 lbs. of 6 tons. I have valued a ton of potatoes as being worth £1—15 tons as worth £15. A ton of hay has been shown to be worth £2 16s.; it therefore follows that 15 tons of potatoes are equal in value to 6 tons of hay at 50s. per ton, and are consequently worth £16 16s., less 1s. 4d. for the 40 lbs. deficient of 6 tons weight, or 24s. 4d. per ton. For the sake of perspicuity, I have kept this, and will keep the remaining calculations as nearly as possible in whole numbers. I think it will be admitted that the basis of my calculation, as regards the value of potatoes, is correct, and will suffice to form a correct datum to proceed on, if the calculation as regards the value of hay is tenable. It must be remarked, that the hay now alluded to is the primest old meadow hay, which is known to possess much greater fattening qualities than that produced from seeds, clovers, or ordinary hay, on which account I have taken the average value of hay of all descriptions at £2 10s. per ton.

With respect to turnips, it is shown in the general report of Scotland, that 34 tons of common white turnips produced 436 lbs. of beef and tallow, which is nearly 13 lbs. per ton. It must, however, be remarked, that the feeding had been continued for five-and-a-half months without a succession of yellow and Swedish turnips; and as the white turnips would undoubtedly have lost a considerable portion of their nutritive qualities at the close of the feeding season, it was remarked that the experiment did not afford a fair average, and that 14 lbs. would be near the mark; at which ratio, 25 tons of turnips would produce 350 lbs. of beef and tallow, which, at 4½d. per lb., will be equal in money value to £6 11s. 3d., or 5s. 3d. per ton. I have only set them down in my calculation at 4s. per ton. It is an erroneous opinion, however, to suppose that the value of common turnips can be fairly estimated by their fattening properties. Their true value is, perhaps, not set forth, either in the low estimate I have perhaps somewhat arbitrarily taken, or in that set forth in the previously detailed experiment. The true place of turnips (common) in the farm-yard, or in the field, is to rear lean stock—their containing a greater amount of the phosphate of lime than the Swedes better adapts them to the growing wants of the cellular tissue of young stock; and, if eaten on the field, shearlings will, on the same account, thrive proportionally better. It is also well known, that an excess of watery food is apt to produce complaints of the bowels, which retards the little feeding properties they possess. It is, therefore, always expedient to give some dry nutritive food with this and all other descriptions of green crops. From these observations the reader will be convinced that my estimate of *the real* value of turnips is too low.

An experiment is detailed in vol. x. p. 266 of the Highland and Agricultural Society's Transactions, which was undertaken for the purpose of ascertaining the relative cost of feeding cattle on prepared or raw food; it was ascertained that the expense of putting on 1 lb. of live weight fed respectively on

	d.	
Raw turnips alone, was .	3½	per lb. live weight.
Potatoes do. .	4¼	do.
Potatoes and corn, was .	3⅛	do.

The above prices were calculated on Swedish turnips being worth 8s. per ton, potatoes 20s. per ton, oats 18s., and beans 24s. per qr.; the cost of fuel for preparing one half of the food consumed is included in the above prices, for which an allowance should be made, as it occasioned extra cost and trouble, the cattle eating more and thriving less in proportion on the prepared than the raw food. In the above-related experiment, the meat fed on turnips alone would cost 5¾d. dead weight; but if the calculation had been made on turnips at 10s. per ton, the cost would have come to 7d. per lb. dead weight. It must be remarked, however, that the inferiority of the half of the lot fed on raw turnips is to be accounted for by the fact, that a heap of turnips from which they were fed had got tainted, and consequently they did not eat their ordinary quantity; in addition, it must be remembered that the feeding on Swedes alone was not the most judicious mode of using them, as was well exemplified by the example of the difference in cost between cattle fed on potatoes alone, and on potatoes and corn. I am, therefore, quite justified in assuming that Swedes eaten with good sound hay, or other dry and superior food, as corn, pea, or bean meal, are worth 10s. per ton, meat realizing 6d. per lb. In vol. xii. of the same Transactions, page 66, it is shown that the cost of producing 1 lb. of live weight is

d.	
4.882	Fed on turnips, oats, linseed, and bean meal.
3.920	Another lot fed on similar food.
4.390	A third lot fed entirely on turnips.

It is worthy of remark, that the total improvement of each lot respectively was, during 17 weeks—Lot 1st, 108 stones live weight; lot 2nd, 101 stones; lot 3rd, 49 stones. This also justifies me in setting forth the value of Swedes at 10s. per ton. As the experiment was only carried on for 17 weeks, the cost of putting on a pound of live weight is higher than it otherwise would have been had the experiment been continued for three weeks (the usual time) longer; the quantity of meat put on during the last weeks of feeding greatly exceeds the amount put on during an equal time when first put up. The above-related experiments are valuable on account of showing that the most economical mode of consuming green crops is to combine them with drier and more nutritious food.

Having thus, though at some length, given the data on which are based the prices I have assumed for the purpose of calculation, I shall proceed to draw a comparison of the relative advantages and disadvantages of permanent grass lands, and the alternate husbandry. Before doing so, I may remark, I have assumed that meat will for the future realize an average of 6d. per pound dead weight, sinking the offal; good meat is higher than that at present, and I do not see any symptoms of its ever becoming lower. The introduction of Indian corn will greatly reduce the cost of raising meat by the means of green crops. An additional reason for taking meat as my standard of calculation is, that the major part of green crops will be eventually converted into meat; besides, I am not in possession of data for ascertaining the relative value of consuming green crops and grain for the production of milk and its products. In the course of the following observations I take it for granted, that the greatest advantage of any system of farming to the public arises from the production, or conversion of productions into such as will return the highest money value per acre, valued either as raw produce or when converted into generally more valuable articles, such as cheese, meat, milk, butter, &c.—the money test, being the surest and fairest, will produce the nearest average results. The farmer will deem that course the best which yields the greatest amount of profit with the least outlay of capital and labour, or that yields the largest net return for the capital employed, and hazards undertaken. Judged in this manner, there are two classes of lands in the kingdom which will always yield the greatest amount of profit and rent by being in pasture. I allude to rich old grazing grounds, and excessively stiff clays, not of first-rate quality. As an example of the first I may mention the rich grazing lands of Lincolnshire; as the second, I may adduce such soils as the Oxford clay, noticed in the report of the implements in the last number of the Royal English Agricultural Society's Journal, when the plough that was drawn as the easiest was obliged to have three oxen yoked to it. On stiff clays the disadvantages attendant on breaking up grass lands arise partly from the expense of working them, being at least double the amount of that arising from breaking up fair friable loams; rains and heat are alike inimical to their working—the one converting the soil into paste or mortar, the other rendering it as hard as a brick, the chances of working such soils are precarious. Another disadvantage is, that stiff clays are not adapted to the growth of such crops as Swedes and potatoes. The only green crop suitable for clay land is rape, which, as it ought always to be eaten on the ground, tends, by the trampling of the animal's feet, to aggravate rather than lessen the evil arising from its over tenaciousness. Mr. Pusey, in the last number of the Royal English Agricultural Society's Journal, records having obtained on the Oxford clay a produce equal to 37¾ bushels of wheat per acre; dressed with 80 yards of burned clay, 45¾ bushels; similarly dressed and folded, 47½ bushels per acre. He states further, that dressing with 80 bushels of burned clay cost £2 5s. I presume a typographical error has occurred, cubic yards being meant, as it is scarcely possible that 80 bushels of burned clay would produce the fertilizing effects stated;* yet, on the other hand, 45s. per 80 yards of burned clay, including preparing, spreading, &c., appears only a small sum. The great fertilizing effects produced by the burned clay, doubtless arose from the quantity of the inorganic constituents of plants set free, particularly potash: further, in such a case, the quality of the soil would be improved permanently by converting a portion of it into something like the consistence of sand, and the dirty ochrouscoloured oxide of iron into the peroxide, both which substances are great amelioriators of stiff lands. The quantity of produce grown on clay lands is so precarious, and depending so much upon the nature of the season, that it is impossible to give data whereon to found anything like correct estimates of the average produce of such soils; but estimating the produce of such lands, dressed as detailed by Mr. Pusey, at 45 bushels per acre, and calculating the same as sold at the average price which I have taken as likely to be the future price of wheat, viz., 50s. per quarter, or 6s. 3d. per bushel, the produce would yield a gross return of £14 5s. per acre. The gross expenses of an acre so cultivated, together with the cost of preparing for and taking to market, marketing expenses, and commission, could not amount to less than £7 0s. 7½d., viz.:—

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* Mr. Pusey has since written to me to the effect that cubic yards are meant, not bushels.

2½ bush. of seed, at 6s. 3d.	£0	15	7½
Ploughing, harrowing, reaping, stacking, thrashing, marketing expenses, and including value of horse labour of every description	4	0	0
Preparing burned clay	2	5	0
	£7	0	7½

To which has to be added the rent of the land. As the above charges are permanent, the deduction of the same from the gross value of the produce will leave the amount of profit derived from the operation. It, however, not unfrequently happens, through the effect of seasons, that the produce will not yield more than 24 bushels per acre, in which case the money value would only amount to £7 10s., which would scarcely repay the farmer for his outlay. Out of the expenses previously detailed, the labourer would perhaps benefit to the amount of £3 5s. 6d., of which sum I calculate, with what degree of correctness I am not enabled to say, that 30s. would be expended in labour in preparing, &c., the burned clay. To add to the receipts of the produce of the land, it may be said that the straw has not been taken into consideration. I admit it; but if it is reflected that the crop of wheat has carried away a considerable portion of the valuable inorganic constituents of the soil, the straw left for manure will form but a poor compensation for the loss thus occasioned, as between the farmer and the labourer the benefit of tilling such stiff soils is decidedly in favour of the labourer. The crop under question (wheat) is one calculated to yield the greatest money return, if, as it usually is, connected with the rotation — wheat, beans, wheat dressed, clover, and not unfrequently a fallow between the wheat and beans: the money return on the average in such cases will be considerably reduced; but what that amount will be, each will be able to judge from his own particular circumstances. As the cultivated crops, in contradistinction to pasturage, are uncertain on such soils in their yield, it becomes a question whether the latter will not yield a greater return to the farmer, the public, and the landlord. If under grass, I venture to assert that such would be the case. There cannot be a doubt but an immense quantity of the stiff clays of England, which were broken up through the temptation of the high prices of grain towards the close of the late continental war, would have long since been laid down to pasture, for which they are better adapted, had not an obstacle presented itself in the fact that such lands are what is technically termed *difficult*, and are a long time of skinning over, after being broken up. That it takes years to obtain so valuable a sward on laying stiff soils down to grass after tillage, as it was when originally broken up, I am prepared to admit; but that an insurmountable objection occurs to laying down such, in consequence of not being so productive when so laid down as in tillage, I will not accede to; the real fault lies in the farmer's cupidity or ignorance. Let us, for example, take a field prepared in the manner shown by Mr. Pusey, and sow the same with rape the latter end of June or beginning of July, the cost would be per acre as follows:—

Preparing burned clay	2	5	0
Ploughing, harrowing, and preparing land	2	4	0
Seed	0	1	6
Total cost per acre	£4	10	6

Rape so sown on a field which was capable of producing in a good season 45 bushels of wheat, would grow so luxuriant that its value to be eaten off by sheep could not be less than £7 per acre, thus yielding a profit of £2 9s. 6d. per acre on the rape, against £7 3s. 9d. on 45 bushels of wheat. It must, however, be remembered that the whole of the fertilizing ingredients of the soil are left with the soiled rape crop, or, at all events, only a very small part is carried away in the increased amount of muscle and bone of the sheep, fat not carrying off any of the inorganic constituents of vegetables. The wheat crop may, through an adverse season, return only £7 10s., or a profit of only 19s. 4½d. per acre; the bean crop will not yield a greater return, and is also precarious; whilst the clover crop cannot be computed to yield more than 3 tons at two cuttings, at £2 10s. per ton, for home use, or £7 10s. per acre, less the cost of seed, mowing, making, &c., in all say £2, or a profit of £5 per acre, independent of the dead loss sometimes arising from a fallow year occurring. The value of the extra manure required to keep the land in heart will reduce the profits arising from the tillage of clay lands, during an average course of six years, to a sum not equal to the profit set forth as returned by eating rape by sheep. The reason why farmers so repeatedly fail to obtain a luxuriant crop of grass from clay lands is twofold: first, they are never laid down but after exhausting corn crops, frequently in a filthy state with weeds; secondly, they are only sown with one or two kinds of grasses and clovers, instead of twelve or fourteen, and these only in one-third or fourth the quantity requisite to produce a permanent sward. On the first point it must be quite evident that it is peculiarly inappropriate to exhaust lands naturally *ill adapted to the early growth* of the ordinary cultivated grasses. Prior to sowing such soils with the intention of converting them into permanent pasture, it ought to be our object to put the land into the highest state of productiveness and tilth, so as to force the seedling grasses forward during their earliest stages; for herein only lies the difficulty, grass on clays, when once swarded over, being found to increase in value for years, and to eventually maintain their fertility when at the highest. The cause of this arises from the fact that clay lands are not easily permeated by the tender roots of seedling grasses; it is consequently expedient that they should be forced into maturity by the presence of an abundance of organic and inorganic manures; the plants thus absorb from the soil as much of these in one year as a dwarf herbage would in three, which is again returned to the soil by the droppings of cattle, and combining with decaying fibre, a greater abundance of which is formed than would have taken place if sown on impoverished land, speedily forms that description of surface soil known as sward, and which is esteemed so valuable. Grasses so grown and consumed on clay lands increase annually in value, because at every year the surface soil becomes thicker, and consequently is more permeable for the plants to grow in, consisting in two or three years of matted roots combined with the decayed and decaying vegetable fibre of existing and pre-existing plants, added to the earthy top-dressing of the slow, silent, but sure-working earth-worm. Experience has shown that old pasture is superior in feeding properties to that newly laid down; the cause of which I venture to attribute to the fact that buds and young leaves contain a greater amount of potash than the matured parts of plants, which circumstance in the grasses adapts them peculiarly well for milk cattle and ewes suckling lambs whilst in the young state; as an exemplification, I may mention the flush of milk given by cows when put on eddishes, and the greater yield of milk given by ewes when put on Swedes or rape late in spring, when the tender seed stalks just begin to shoot out; though these qualities are valuable, they retard the feeding properties. On the other hand, the more slow-growing old grazing grounds possessing more gluten in proportion to their weight, gives them greater feeding powers, although the weight of vegetable fibre may absolutely be less. It is quite possible that Mr. George Sinclair may be wrong in stating that land can be returned to pasture, and be as valuable in the course of three or four years as what it was previously to being broken up; that it will nearly approximate to it is possible. The great supply of the inorganic constituents of plants existing in clay soils, which are being continually abstracted by the roots of old grasses, and are returned again to the soil by their decay or the droppings of cattle, amply supply the remaining grasses therewith, and compensate for the ordinary waste of inorganic constituents which may be taken away in bone, muscle, milk, &c. As regards the propriety of sowing a larger amount of seed than is usually done when laying down grass land, I shall quote the words of Mr. Sinclair:—

"The superiority of ancient natural pasture over those formed artificially with rye-grass and clover, was before alluded to.

"It will be found principally to arise from the variety of different habits and properties which exist in a numerous combination of different species of grass. From the beginning of spring till winter there is not a month that is not the peculiar season in which one or more grasses attain to the greatest degree of perfection. Some grasses there are that withstand the injurious effects of long-continued dry weather better than others, and *vice versâ*. Hence the comparative never-failing supply of nutritive herbage obtained from natural pastures, which it is vain to look for in those artificially formed with one or two grasses only. [He illustrates this by reference to turfs, a foot each, taken from rich pasture land belonging to the Duke of Bedford, from Endsleigh in Devonshire, but it is not necessary here to enumerate their names; he further adds]—To those who are accustomed to consider as necessary one or two species of grass only, as rye-grass and clover, the fact of twenty-two different species of grasses and other plants being produced on something less than the space of a square foot of the best fattening pastures would scarcely appear credible, unless it was thus demonstrated. The pasture, of which this turf is a specimen, on an average per acre, fattens one bullock of from 100 to 120 stones, Smithfield weight, and winters two sheep. In the richest fattening pastures of Lincolnshire, which I have had an opportunity of examining minutely, and which were fully equal to fattening one large ox and four or five sheep per acre, the different species of plants were equally numerous on a given space of the ground, as in those rich pastures I examined in Devonshire; but in the Lincolnshire pastures the natural or proper grasses were in a much greater proportion, and, excepting yarrow and the clovers, there was scarcely a plant out of the family of the proper grasses. The results of an examination of the rich fattening pastures of the Vale of Aylesbury, particularly those of Mr. Westcar, at Creslow, were in perfect accordance with the above. [The following is most important] :—The proper quantity of grass seeds to sow per acre is a point of the greatest importance, as regards the expense of the seed, and speedy formation of the most valuable sward. The circumstances of soil, tilth, and weather, at the time of sowing, all influence, in a great degree, the successful vegetation of the seed. Should less seed be sown than is sufficient to furnish every part of the soil with plants of grass, a proportionate loss of time, labour, and land will be suffered. Minute vacancies of plants in a recently made pasture, or in a field of seedling grasses, may, to a general observer, appear insignificant, or escape observation altogether; but if these apparently minute deficiencies which occur over the surface of an acre be calculated, a difference, perhaps, of from ten to fifteen per cent. in the produce will be found to exist between a perfectly furnished surface of land and one where the deficiencies of plants are so minute as scarcely to be perceived. In the most productive natural pastures no deficiencies of plants are to be found, every part of the surface is closely interwoven with plants; and not as in pastures artificially formed of one or two species of grass only, where the surface is merely shaded or covered by the foliage of the comparatively thin growing plants."

The last quoted remarks are important to all laying down land to pasture, but more particularly so on clay lands. The extracts are lengthy, but they are so pertinent to the subject that I could not resist the opportunity of inserting them, coming as they do from a person so thoroughly conversant with the subject. Another very powerful reason exists why a variety, and also a sufficient quantity of seed, should be sown, but particularly on clay land, viz., that a numerous amount of plants is more likely to shelter the soil from the scorching effects of hot weather, by occupying space which would otherwise be more exposed to its influence, besides greatly accelerating, for many reasons, the formation of sward. The following are the grasses best adapted to form permanent pasture ground on heavy clays, viz., timothy, cocksfoot (these two ought to form a considerable moiety), meadow foxtail, fertile meadow grass, crested dog's-tail, perennial rye-grass, hard fescue, a small quantity of the *Agrostis stolonifera* or *fiorin*, the perennial white and red clovers, and of course others can be added; for various recipes I must refer to Sinclair. Respecting the mode of consuming the first crop of grass seeds, I incline to the opinion of Mr. Sinclair, that they are best mown when it is convenient. I should recommend mowing at least three times, and consuming the produce as green food; afterwards stock the same with shearlings, and in the following spring young neat cattle might be turned in if required, though it would be much better to pasture with sheep thereon for the first two or three years, turning young cattle on only during the day. Managing clay land in this way will no doubt be unfavourable to the labourer; but to the public, the landlord and the farmer it would be beneficial. To the public it would be beneficial, as it would produce the greatest annual amount of produce at the smallest cost of labour, which might be beneficially employed in other channels; for a similar reason it would be beneficial to the occupier, besides enabling him to exercise his supervision over a greater extent of land; consequently a smaller proportion of profit would satisfy him, the difference of which would eventually find its way to the landlord, who would also be benefited in another way, viz., when in grass, he would be perfectly secure that the tenant was not exhausting his soil. One great disadvantage that clay lands labour under is, their non-adaptation to the alternate husbandry, no green crop flourishing on them except rape. Thus the farmer cannot maintain the same quantity of stock in winter as in summer. The occupier of such soils might, however, venture to keep a small portion under tillage, commencing, if broken up from grass, with rape fed off, followed by beans, wheat, clover, or grass seed, broken up again the second year with rape, manured with bones or guano instead of clover and mixed grass seeds. If not intended for permanent pasture, I should recommend one stone of timothy with seven stones of red clover and five stones of white clover, to be sown per acre, timothy yielding an enormous quantity of hay, very much relished by all kinds of stock, especially by working horses: it ought to be made into chaff, as in strong clays in good heart it will grow almost as coarse as straw. If one-sixth of a clay land farm were under a rotation such as described, it would yield the greatest amount of produce at the least cost of any other system; and as for winter food, there would be rape, timothy, and clover, hay, and bean haulm, with wheat straw for bedding.

I shall now enter upon the inquiry what would be the probable return of permanent pasture. On clays laid down as described, a bullock would fatten from 40 stones to 60 stones of 14lbs. dead weight, or 280lbs. at 6d. = £7, besides wintering two sheep to the acre. As this would be attended with little labour and expense, it is evident that the profit to the farmer will greatly preponderate by this system. I have not, in this case, taken any account of rent, as whatever that may be assumed to amount to, it will equally apply to both arable and pasture land. The calculations made previously, as well as all future ones, as to the amount of crop, are based on the supposition that the lands have undergone a perfect system of drainage; on which point I may remark that, in laying down clays to pasture, it is of much greater importance that the land should be drained in the first instance, rather than after being in grass for some time, as a partially porous soil eventually forms itself on all grass lands by the accumulated decay of vegetable fibre. Rich grazing lands, such as the celebrated Lincolnshire marshes, between Skegness and Wainfleet, are more profitable to the tenant, the landlord, and the public, in grass than in tillage, because land of the description now noticed will be equivalent to putting on 5 cwt. of meat per acre per annum, or 560lbs. at 6d. per lb. = £14 per annum; this land is about £2 to £2 5s. per annum rent, with from 10s. to 15s. taxes. Presuming such land to be already under tillage, but in as good heart as when broken up, I assume it will yield the following produce:—

	£	s.	d.
Swedes, 30 tons per acre, at 10s. .	15	0	0
Potatoes, 20 ,, 20s. .	20	0	0
Wheat, 40 bushels per acre, at 6s. 3d.	12	10	0
Clover, 2½ tons, at 50s., £6 5s.; eddish, £1. . . .	7	5	0
4)	54	15	0
	£13	13	9

or 6s. 3d. per annum less than pasture; and if the rotation is carried further, the average annual return will be found less. The above rotation is founded on the assumption that the consumption of potatoes, wheat straw, and clover will produce a crop of Swedes, and the crop of Swedes eaten by sheep will again produce a crop of potatoes; if barley had followed Swedes, it could not be expected to produce more than 56 bushels, at 3s. 6d. per bushel, which would only amount to £9 16s. We cannot, therefore, be surprised at the reluctance of farmers breaking up old grass lands of rich quality; but notwithstanding the advantages here set forth in favour of old pasture on rich land, the occupiers labour under one disadvantage, viz.—that a large portion of the stock has to be sold off in autumn (some on highly favoured and early soils will manage to get beasts to market the latter end of July or beginning of August, when meat is at the highest), when prices are at the lowest, while purchases have to be made in spring, generally May, when stock is dearest. The profit of grazing such land as that just noticed would be very great, had it not this drawback, viz.—the different value of cattle at the time of buying in and selling out, as it far from unfrequently occurs that the grazier has to give £4 per head more for a beast at the time he purchases it, than its weight would amount to if valued at 6d. per lb. dead weight. It therefore becomes a question of primary importance to the occupier of rich grazing districts whether it would not be to his advantage to break up a small portion of his most inferior grazing ground, for the purpose of procuring winter food to rear stores to put on his richer grounds in summer; this point I am not able to answer.

Under the head of *good loams, meadow and grazing ground,* I include lands of the quality which will perhaps, on an average, be worth about £1 5s. rental, and 7s. 6d. taxes. Such soils as are now under consideration are used promiscuously for grazing to fatten, grazing for dairy purposes, and feeding stock, or, as in some places, under the alternate husbandry, they are the most kindly soils for tillage that we have; and though, under favourable circumstances, in some places a higher rent is given for this kind of land than even the richest grazing land, I have set the price previously named because loamy soils are generally found in undulating counties, and considerable differences exist in the quality of land on the same farm; on the clays, fens, and wolds, the soil being generally of a more even quality. Land of the quality now under consideration will about summer-graze one milch cow per acre, keeping her at the same time in good fair condition. A cow the year round will consume, in one form or another, the produce of three acres of this kind of land; and for such land, it is assuming a somewhat low average for a cow to yield 9 quarts of milk per day for 280 days, or 2520 quarts=630 galls., which at 1½d. per quart, will

yield	£15	15	0
Do. do. at 1¼d. do. . .	13	2	6

According to some experiments related in the Farmers' Series of the Library of Useful Knowledge, it is shown that 100 gallons of new milk yield 112 lbs. of the best cheese, worth 6d. per lb., and 5 lbs. of whey butter; that 100 gallons of milk made 34 lbs. of the best butter, and 74 lbs. of cheese of the worst quality, value 3d. per lb.; at which ratios, and they nearly agree with two other experiments which are related as having been made for a similar purpose, viz.—to ascertain the most profitable mode of converting dairy produce into money—it would follow that 630 gallons milk

	£	s.	d.
would yield 706 lbs. of cheese, at 6d.	17	13	0
Do. do. 31½ lbs. of whey butter at 9d.	1	3	5½
	£18	16	5½

	£	s.	d.
Do. do. 214 lbs of butter at 1s.	10	14	0
Do. do. 416 lbs. of cheese at 3d.	5	16	6
	£16	10	6

It will be apparent to those generally acquainted with the different agricultural districts, that the extreme returns just stated cannot be obtained other than in particular districts. As the above experiments are related of parts of Gloucestershire, it is more than probable that they were made on richer land than that now under consideration. I think I may, under all the circumstances, fairly average the value of milk at 1¼d. per quart, which it certainly would be equal to, if we value butter at 13d. per lb., as per following calculation:—

	£	s.	d.
214 lbs. of butter, at 1s. 1d.	11	11	10
630 gallons of sour milk, at 1d.	2	12	6
	£14	4	4
630 gallons of new milk, at 5d.	£13	2	6

A farthing a quart, or 1d. per gallon, may be thought too high a value for butter and sour milk to be used merely in feeding pigs; yet it ought really to be worth more, seeing that it contains 0¾ lb. of cheese. Sufficient is, however, stated to show, that if butter averages from 1s. to 1s. 1d. per lb., and sour and butter-milk are properly used in feeding pigs, 1¼d. a quart for new milk will be somewhere about the correct average value. The account will then stand thus:—

	£	s.	d.	£	s.	d.
A cow yielding 2520 quarts, at 1¼d. per quart, will amount to				13	2	6
Expenses.—3 acres of land, rent, and taxes on do., at £1 12s. 6d. per acre	£4	17	6			
Expenses of making hay, straw, &c.	1	4	0			
				6	1	6
Net profit on the cow				£7	1	0

But as the cow consumed the produce of 3 acres of land, that amount will have to be divided by three, or a profit of £2 7s. per acre.

Let us now examine the same land under tillage.

It will produce of	£	s.	d.
Potatoes, 15 tons, at 20s.	15	0	0
Wheat, 32 bushels, at 6s. 3d.	10	0	0
Swedes, 20 tons, at 10s.	10	0	0
Barley, 40 bushels, at 3s. 6d.	7	0	0
Clover, 2 tons, £5; eddish, 15s.	5	15	0
	£47	15	0

	£	s.	d.	£	s.	d.
*Expenses.** — Rent and taxes on 5 acres at 32s. 6d.	£8	2	6			
2½ bushels of seed wheat, at 6s. 3d.	0	16	3			
Expenses of tillage of wheat crop, thrashing, and marketing expenses, including commission	2	19	0			
Seed potatoes, 110 stones at 1½d.	0	13	9			
Ploughing, setting, digging, storing, &c., do.	1	10	0			
Turnips, preparing land hoeing, seed, weeding, and carting manure, &c.	2	0	0			
Seed barley, 3 bushels	0	10	6			
Tillage, and charges up to sale	2	10	0			
Clover seed, 10s., mowing, making hay, &c.	1	10	0			
				20	12	0
				5) 27	3	0
Average profit per acre				£5	8	7

As the clover is presumed to be again broken up to grow potatoes, the sum set down may be assumed as the annual profit on the alternate husbandry, viz., £5 8s. 7d. per acre against £2 7s. on the grazing land, or a difference of £3 1s. 7d. per acre to the former, in favour of breaking up grass lands of this description; and the public will be advantaged by produce being obtained equal to £9 11s. per acre on the land in tillage, against £4 7s. 6d. on the pasture land, or more than double. Of the expenses laid out in manual labour, I estimate the amount as follows—

	£	s.	d.
The wheat crop	1	17	6
The potato do.	2	0	0
The turnip do.	0	15	6
The barley do.	1	15	0
The clover do., 2 cuttings	1	0	0
	5) 7	8	0
Average amount paid for labour per acre	£1	9	7

Presuming the cow used an acre of hay, and the small charge apportioned to her for attendance, &c., it would not amount to more than 12s., or 4s. per acre per annum for labour. In such a case, every party is interested in favour of the alternate husbandry; and a wise farmer will always have at least four-fifths of his farm under such a system of tillage—the landlord will receive a greater rent than when under grazing, and the public be benefited.

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* All these calculations are based on the charges most likely to occur in England. How far they will agree with farming in Scotland, the writer cannot give an opinion.

In the course last noticed, the manure arising from the potatoes and wheat straw is applied to the turnips: turnips folded yield manure to the barley and clover, the clover and barley straw being applied to the potatoes. In theory, we need only return the same inorganic and organic materials that we remove from our fields in cultivated crops, to retain them in an uniform state of fertility; but, in the rotation stated, it will be perceived that we remove in two crops (wheat and barley) a considerable portion of phosphate of lime and potash, and also nitrogen. Even, therefore, in the course set forth—and it is one less obnoxious to the charge of exhausting than any of the ordinary courses of husbandry—it will be perceived that each course will inevitably deteriorate the staple of the land; for, though nitrogen *might* in time be supplied from the atmosphere, the phosphate of lime, and other inorganic constituents, can only be replaced by a direct application. It is true that clay soils contain an abundance of potash, but such is not the case with sandy soils abounding with vegetable matter. Another reason for deterioration arises from the circumstance, that at least two-thirds of the organic and inorganic constituents of crops consumed by farming stock are wasted, the urine being allowed to run waste; and, from the want of proper precaution, a large amount of the valuable constituents of manure heaps is rendered soluble, and if not carried away by the rains, which fall upon the heap, at all events will most certainly be so when applied to the field; and, to aggravate the matter, the valuable inorganic constituents of the heap so presented to the field are in a soluble form, which, instead of being of advantage, is the contrary. A simple expedient would prevent this in a great measure with the solid heap, whilst a tank would prevent a large amount of the waste from liquid manure. With every precaution, some waste will take place, both with the most careful management before application, as well as by the inevitable loss occasioned by some portion being carried off in solution by rains. The loss, however, on these grounds, together with that occasioned by the disposal of the two grain crops, would be replaced by bones and potash, or guano and potash, which could be purchased for 25s.; or 5s. per acre will be amply sufficient for the losses which are thus occasioned. In this calculation, it must be borne in mind, that the utmost care is taken both of the liquid as well as the solid manure, the due appropriation of the latter being also another important item. As neither of these requisites is attended to by ordinary farmers, we cannot be surprised at the results. Seeing that a supply of manure must be obtained somewhere, it becomes a question of moment in what way can these be obtained the cheapest. There are two ways only of doing so, viz., by direct purchase; or by buying oil-cake, Indian corn, pulse, or other more valuable feeding materials, and consuming the same in conjunction with green food, hay, straw, &c., by which means are obtained the inorganic and some of the organic constituents of substances which have served to feed cattle, and thus repay the farmer for his outlay; and, as it has already been shown that the full value of the feeding properties of green crops is only obtained when consumed in combination with more valuable feeding materials, it follows that in this manner the farmer may obtain a supply of the inorganic constituents without any cost whatever. Oh! but I fancy I hear a farmer say, Where's the capital to come from to do all this? My answer is, that if he has not sufficient capital to do this, he cannot properly manage his farm; and if he has 400 acres, let him part with 200, and if 200, let him part with 100, or until his capital is adequate to his farm. The explanations just given must be decisive with all thinking men as to the ruinous consequences of repeatedly growing grain and exhausting crops, whilst they at the same time exhibit the true *rationale* on which a correct system of husbandry ought to be founded.

With respect to the breaking up and tilling of down-land, there are fortunately on record the valuable opinions and facts of Mr. Thomas Walkden and Lord Portman, which may be seen on reference to the 4th volume of the Royal English Agricultural Society's Journal, pages 80 and 81. The opinions given by Mr. Thomas Walkden are particularly valuable, coming, as they do, from a gentleman who states that he farmed for twenty-six years on the North Wolds of Lincolnshire, and frequently visiting friends and relations who were agriculturists in Yorkshire and Nottinghamshire, and his present acquaintance with the south-west of England, by farming 400 acres of the lightest part of Salisbury Plain. It is not often that the public can be favoured with the opinions, backed by practice, of persons who have removed from the northern counties to the Downs of the south and west. The sentiments, therefore, of such a person as Mr. Walkden are particularly valuable. The practice recommended by this gentleman to be pursued on down-lands precisely coincides with what I have already repeated as regards loams; and I venture to assert, that it will hold good with all lands whose quality shall be between stiff clay and very light hungry sands and gravels, viz., the cultivation of green crops in preference to corn crops. On this point, Mr. Walkden admirably observes, that—

"To keep the greatest quantity of stock profitably, both winter and summer, should be the first object of every occupier of light land. Additional corn crops may make a greater return for a short period, but *eventually* will not reach the average profit of the system of cultivation which I have recommended (*green crops;*) while to improve the condition of such land, by such means, would be in direct opposition to established facts."

On the course recommended by Mr. Walkden, viz., manuring with bones, &c., feeding with cake, &c., let us hear what he says:

"The farm I now occupy, in the lightest part of Salisbury Plain, was taken in 1832, on a ten years' lease, at 24s. per acre, rent and tithe. The first crop was wheat, which, I believe, exceeded 4 quarters per acre. The next oats, which I ascertained to be nearly 8 quarters per acre. Then turnips, without manure, except 1 quarter per acre of bone-dust for the Swedes. The occupier then left it, declaring that the land was exhausted, and would ruin any one to work out the lease. I ventured to undertake the farm for the remaining term; and for the first three years I certainly had the worst crops imaginable: wheat and barley little more than the seed again; oats about 4 quarters per acre, under 30 lbs. per bushel; grass seeds would not grow, the land was so light—indeed, such clouds of dust frequently blew from the land that sheep could not pasture near it. The improving state of the farm, from the turnip system and artificial grasses, fed green, is now apparent; 7 quarters per acre of oats are easily obtained, and of good quality. The present rent and tithe (though too high for the times) are 18s. per acre—at least four times their original value."

I presume the above land, when broken up from old down pasture, would produce in meat and wool the value of £2 10s., certainly not more than £3 per acre, on which, of course, the labour employed would be trifling. I propose breaking it up in the following manner, viz.:—

	Value of Crop. £	s.	d.
Rape on the lea, eaten by sheep,	5	0	0
Potatoes, 10 tons, at £1 per ton,	10	0	0
Wheat, 28 bushels, at 6s. 3d. per bushel	8	15	0
Vetches, dunged and eaten by sheep, £5; potatoes, £10	15	0	0
Wheat, 28 bushels, at 6s. 3d.	8	15	0
Clover, 1½ tons, £3 7s. 6d.; eddish, 12s.	4	0	0
Clover grazed,	3	0	0
Potatoes manured,	10	0	0
Tares (eaten) £5; rape ditto, £5	10	0	0
Grass, either as hay or fed off,	4	10	0
Or, on an average of 10 years, £7 18s. per year	£79	0	0

	£	s.	d.	£	s.	d.
Expenses. — Rent and taxes on 10 years, at 30s. per acre,	15	0	0			
Seed Wheat, 7 bushels, 6s. 3d.	2	3	9			
Rape seed,	0	3	0			
Seed vetches.	1	12	0			
Seed potatoes, 360 stones at 1½d. per stone.	2	5	0			
Clover seed, 10s.; mowing, &c., 20s.	1	10	0			
Tillage of 3 acres of potatoes,	4	10	0			
Expenses of tilling rape,	2	0	0			
Ditto tares, £1; expenses on wheat, £5	6	0	0			
Share of grass seeds, being 2s. per year for 10 years,	0	2	0			
				35	5	9
				43	14	3
Net amount of profit on a 10 years' rotation,				£4	7	5

An *annual profit* greater than the whole value of the produce, prior to being broken up, on down-lands and others of the like light nature. It is very questionable whether long rotations are advantageous, as the firmness of such land in a great measure, if not wholly, depends upon the amount of vegetable fibre, which retains any manure or dressing better than the light soil otherwise would do. I rather think that a shorter course would be preferable: when, however, there exists sufficient aluminous matter, the loss will be of little consequence. As down-lands are light, it is evident that on such, and also on sandy soils, manures that are applied will rapidly be carried away by solution in rain water; or are what are technically called hungry soils (they are so in a much greater degree than loams), to supply which would perhaps entail an expense of from 5s. to 10s. per acre per annum; this sum would have, therefore, to be deducted from the profits. A shorter course might be as follows:—

	£	s.	d.	£	s.	d.
Potatoes, 10 tons,				£10	0	0
Wheat,				8	15	0
Vetches manured, £5; potatoes, £10,				15	0	0
Grass,				4	0	0
Or a produce of £9 8s. 9d. per annum,				£37	15	0
Expenses. — Potato seed and tillage, £4 10s.; wheat do., £3 11s. 10½d.	£8	1	10			
Vetches, seed and tillage, £2 12s.; rapeseed, &c., 10s.	3	2	0			
Share of grass seeds	0	2	0			
Ten years' rent and taxes, at 30s. per annum	7	10	0			
				18	15	10½
				5)18	19	1½
				£3	15	9¼

The amount that would be spent on labour in the various croppings on down land would probably amount to from 2s. to 3s. less than on that of good loam, the crops being lighter, and the land also easier to work.

The course here recommended for breaking up old leas is different from that usually pursued, oats or wheat being generally taken; the most common course is to take a crop of oats. I am averse to both; oats, on account of the crop being of so little value, whilst it is extremely exhausting; wheat, because it is particularly obnoxious to the wire-worm on lea land, and in other respects is objectionable. It may appear strange to recommend rape and potatoes for the purpose, but I can assure the reader that it is the usual course pursued in the best potato growing districts in Lancashire and Cheshire, and is the almost universal practice in Ireland, excellent crops being obtained in this way; rape also grows well on lea. But I do not deem down-land adapted to rape; I should on such recommend potatoes to be taken. There is one crop better than all others adapted for lea, *provided* it is in fertile condition, viz., flax, which on down land that would bring four quarters of wheat when broken up from the lea, would yield a crop of flax worth £30, the charges on which, including rent and taxes, at 30s. per acre, would amount to about £13 10s., of which sum £11 10s. would be expended in labour. The growth of flax ought to be encouraged above all other descriptions of agricultural produce. As it cannot be profitably grown unless the ground is in good condition, both as regards cleanliness and heart, many landlords have prohibited its growth, under the impression that it is a highly impoverishing crop; yet it is not so impoverishing a crop as wheat, even if allowed to stand for seed; and if pulled in the white, is the least impoverishing crop that is sold off the farm. The water in which flax is retted should always be thrown on meadow or pasture land. There is a singular circumstance that peculiarly fits flax for cultivation on weak soils, such as downs and sandy soils, viz., that a crop of 38 stones is often more valuable than one of 70 stones; indeed, poor soils, with care and attention, will yield quite as good a return from the sale of flax fibre as richer lands, but poor soils will not bear its being so frequently grown. I shall, on the subject of flax, again quote Mr. Walkden, with which quotation I shall nearly conclude the subject:—

"I beg to give you another instance of down land of a stronger and better description, being brought into the northern system of cultivation by Mr. Brough, of Shaw farm, near Marlborough. He has boned his land to a very considerable extent; and his turnips, thus managed, have invariably been a great crop. It is his opinion, that were the system of two corn crops in succession, and of mowing the seeds for hay instead of pasturing with sheep, done away with, the land would become more certain for turnips, particularly Swedes, than in the north. He has also grown linseed with success, for which he considers the *lightest of the downs* particularly adapted. He thus obtains a substitute for oil-cake—the carriage on which from London renders it very dear. Linseed is sown instead of barley or oats in spring. He has brought into cultivation the whole of his down pastures, and is enabled, by artificial grasses, to keep more sheep in summer, and much better than in its original state. But his greatest advantage is in the winter; a good turnip system, instead of hay, enabling him to provide food for many more sheep at a far less cost, as well as keeping them in a much higher state of condition. In short, the farm will bear comparison with the rich lands of the neighbourhood considered of twice the value."

When a flax crop is to be taken, the following course may be recommended:—Flax on the lea; if pulled in the white, a crop of turnips taken the same year, fed off, followed by potatoes (if left for seed, wheat next); wheat after potatoes; clover hay, pasture, potatoes, tares and rape, pasture seeds. In this course, as well as all those precedingly related, potatoes can be replaced by Swedes if desirable. The courses recommended are not those usually pursued; to many they will doubtless appear Utopian, but I challenge any one to impeach their general accuracy. In so far as a subject so difficult to detail can be reduced to figures, I have no doubt but the crops on the light lands would in practice entail an expense of 5s. to 10s. per acre in purchasing bones, guano, &c. With that exception I believe the calculations are based on as fair averages as the subject is capable of being reduced to.

It will be seen, from all that has been stated, that stiff clays and rich grazing lands will pay the best in permanent pasture; that good working loams, down to sandy and poor down-land not worth more than 12s to 15s. per acre rent, are best in alternate husbandry; and their respective value, as regards the alternate husbandry, gradually decreases as the land becomes poorer, until it reaches a point when their cultivation is no longer profitable. It is, however, uncertain whether it would not be profitable to break the poorest soils up once in about fifteen years, and till them for a period not exceeding three years, and then lay them down again in good heart. Whenever I allude to laying down land to pasture, I always mean that it should follow a crop of turnips or rape, soiled by sheep; in no other way will good permanent pasture be obtained in anything like a moderate space of time. As an example of this system, I will detail the following instance of what was done on a farm in Holbeach March thirty years ago. The field contained 25 acres, and 17 acres were sown with turnips, and 8 acres with rape. In the month of August, six pecks of rye-grass were sown to the acre; at the beginning of November, the rape was consumed in the ordinary manner, turnips being folded; during the first week of the following March, 10 lbs. of white and 4 lbs. of red clover and trefoil per acre were sown; 250 sheep were bought at Boston market the 4th of May in the same year, and turned on to it; a fortnight afterwards, 250 more sheep were purchased, and turned in with the rest; the whole were disposed of at Smithfield by the end of August in the same year, the profit on which must have been very great, as the sheep, a cross between the Lincoln and Leicester, would clip 14 lbs. of wool per sheep. No corn crop would yield anything like the same profit. In order to economically lay down grass land, it will of course be necessary for the farmer to keep a sort of grass garden, as to obtain seeds in the quantity and of the quality desired would cost, to purchase the same from seedsmen, 50s. to 60s. per acre. On this, as also the best description of grasses adapted to each sort of land, I must refer to Mr. Sinclair's work, where the reader will obtain every information. The principle on which the course recommended to be pursued in this paper is that so pithily set forth by the celebrated Mr. Bakewell, of Dishley—" that the rearing and feeding of stock is the best mode of turning vegetable agricultural produce into money." I may add thereto, that growing too many grain crops is, like paper money, " strength in the beginning, but weakness in the end."—Journal of Agriculture.

BUCKWHEAT A SUBSTITUTE FOR POTATOES.

BY JAMES KEIR, M.D., EX-PROFESSOR AND HONORARY MEMBER OF THE IMPERIAL ACADEMY OF MEDICINE AND SURGERY, AT MOSCOW.

Having lately read with pleasure and interest a poetical eulogy, by an American, on Buckwheat pancakes in the supplement to the *North British Advertiser,* it may not be judged superfluous to add a few remarks on that most excellent grain, considered generally as a superior article of farinaceous food for man, and under the present defective state of the potato crop, affording, where it can be got, one of the best substitutes for it, and, generally speaking, a more nutritious and safer article of food than the potato.

Buckwheat, " Blé Sarrasin," ou " Blé noir" des François, is an eastern plant; it grows readily in light sandy soils, and when the grain is deprived of its exterior coverings, and fully ripened by a sufficient exposure to the sun's rays, it appears under the form of a dry triangular seed, covered with a thin brownish red cuticle, not very deep coloured ; such is the appearance of the best or thoroughly ripened buckwheat as it appears when brought to market by the Russian peasantry—when, however, it has already undergone, by passing through the mill, a process by which each seed is divided into two or three parts, and is thereby better fitted for the purpose intended, to be afterwards described. When the season has been less favourable to the full maturity of the seed, the cuticle is of a pale green colour; as it is met with in the seedsmen's shops of this town, the cuticle has a light brown, and the covering immediately exterior to it a dark brown chesnut colour. Buckwheat is grown, I believe, in different parts of England, particularly in Yorkshire, where it is chiefly used, I am told, for feeding poultry, which thrive well, and fatten upon it. In Scotland it is very little known, and seldom used, excepting for the purpose of feeding and encouraging the breeding of pheasants; our millers and bakers are hardly acquainted with it, but the said birds, guided by unerring instinct, are said to be very fond of it. In the state above described, as brought to market by the Russian peasantry, it is fitted for culinary use; and the ordinary mode of preparing it is the following :—A common earthen pot or pipkin, generally unglazed, of a size corresponding to the number of persons intended to partake of its contents, is filled about two-thirds full with the grain, and the remaining third nearly filled with fresh water, the pot or pipkin is then placed in an oven,* sufficiently heated to make the water in the pot boil slowly, and to keep it boiling till the whole of the water has disappeared, and the grain begins to dry, when the heat of the oven may be diminished; the contained grain thus becomes gradually soddened; it swells, and commonly projects over the top of the pot, when it forms a thick dark-brown hat or crust. When this appears to be dry and begins to crack it is ready for use, and being covered with a plate or saucer, should be sent to table in the pot as it has been prepared. When used, the crust should be first removed, and, when it can be got, a piece of butter and a small quantity of salt added to the grain, and the brown hat broken up and mixed with the pottage below. Thus, prepared, it forms a most agreeable, substantial, and nutritious article of food, and, where it can be got, a most excellent substitute for potatoes—far superior to oatmeal. It is a favourite and daily article of food with the peasantry and working classes of Russia, who would not exchange it with any other article of food; and this, joined to prejudice, is probably the reason why the use of the potato has hitherto made comparatively so little progress among the peasantry of that country; with their rye-bread, cabbage-soup, and buckwheat pottage, they feel no want of the potato.

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* In default of an oven, heat gradually and equably applied in any other way will do.

The buckwheat pottage eats well with milk, or simply as above prepared where the circumstances of the person prevent his procuring the accessories of milk or butter.

Buckwheat ground into flour and made into pancakes, as recommended by the American, is much used in Russia by all classes, especially in the carnival, or butter week preceding the fast of seven weeks of the Greek church before Easter; and I do not doubt of its being well adapted to the making of loaf bread, though I have hardly seen it used in this form.

But it is not alone as an excellent article of food that the writer of this would wish to direct more attention to buckwheat in this country than it has hitherto received. With an annually increasing population, and the efforts of the country strongly directed to the means of affording cheap grain and bread to the population, it surely is the duty of both landowners and tenants, merchants, &c., to embrace every opportunity of affording an abundant supply of farinaceous food, and in some variety, to the public; and, taught by present experience, not to rely so entirely as they have hitherto done on the potato as an article of food. Too much praise cannot be bestowed on those who are endeavouring to supply in some degree the deficiency of the potato crop by the introduction of maize, and other farinaceous grains, among which a more frequent and extended use both of rye and millet should not be lost sight of. But there is none of them superior or equal to buckwheat as an article of pleasant, substantial, and nutritious food, and therefore better adapted as such for the use of the labouring classes. I have been informed that it succeeds well both in the west Highlands of Scotland and in Ross-shire; and I have lately learnt from two different respectable persons that some fields have been growing this summer between Musselburgh and Portobello, near Edinburgh, and in Kyntire; and I do not doubt that there are many localities both in Scotland, England, and Ireland, where the culture of this most excellent article of food would prove a real and positive blessing to the population. I was happy to learn from the *Spectator* that lately there had been a considerable importation of buckwheat into Liverpool, I presume from America. It may also be got, I suppose, in some quantity from the ports of the Baltic and Black Sea, as well as from America.—Gardeners' Chronicle.

TRAP ROCK AS MANURE.

Sir,—In my former letter I stated that I had used a quantity of what I termed marl, but which term ought to be a trap rock, containing felspar and hornblende. The constituents of trap are silica in a soluble or disintegrated state, available to plants, alumina, potash, soda, lime, magnesia, oxide of iron, and oxide of manganese; and this rock contains in addition to the constituents of trap, eleven per cent. of carbon.

Any person wishing to see its effects as a manure on vegetation, may, at Cwmguanum Clyro, Radmorshire, see three fields under wheat, that were dressed with it last year—two of them with a ton per acre, and about six tons of dung, and one with two tons, which was very low in condition, and no dung. The result is, that the three fields will average from 4½ to 5 qrs. of wheat per acre, which is an increase in favour of the manure of 1½ to two quarters per acre, as they never exceeded three before. In 1844, I dressed an acre of the poorest part of a field with a ton of the trap for turnips, and the remainder of the field with 25 loads per acre of dung for potatoes. I sowed swedes on the part which had the trap-rock, and the flies took the most of them off, and I then harrowed in others which the flies also destroyed; there were some few of the first sowing that escaped both the fly and the harrow, which grew in that dry season to a large size. I sowed wheat after the potatoes at Michaelmas, and the turnips were gathered off in the spring and the ground sown with wheat. This year, without any other manure, I sowed the whole field with wheat in March, to see what proportion the one ton of trap would have to the 25 of dung, and the difference is in favour of the trap rock. In the second crop I have dressed three meadows with it, and the increase in crop is more than a third, as well as a better and more nutritious herbage.

Any person wishing for information respecting trap rock as a manure, if he will look at Professor Johnston's Elements of Agricultural Chemistry and Geology he will see it stated by him that it contains every nutriment vegetation requires. If it was pulverized to a fine powder, five cwt. per acre would be sufficient.

I wish to have it viewed by agriculturists that they may see its effects on vegetation, corn, and grass, before I offer it for sale.

Hay, July 20. John W. Lloyd.

—Hertford Times.

ON THE ADVANTAGES OF CHEMISTRY TO THE FARMER.

[We are indebted for this article, as well as the preceding one by Dr. Daubeny, p. 410, to the *Pharmaceutical Times*.—ED. F. MAG.]

We alluded in our last to the benefits which were already beginning to dawn on agriculture by the adoption of chemical expedients and resources—we promised to revert to the subject again; and an admirable paper from the pen of Professor Daubeny, of Oxford, appearing in this number of our journal, naturally calls our attention to the matter of which it treats.

Amongst the various manures which are known to the farmer, and have been employed from time immemorial in the fertilization of soils, lime occupies a very conspicuous place. Yet most conflicting are the opinions of farmers as to the proper condition in which it should be employed—some advocating its use whilst yet in a caustic state; others, on the contrary, taking every precaution to destroy this causticity; and each, in his turn, citing the all-weighty authorities of experience and precedent. Doubtless the advocates of both sides are quite correct—neither experience nor precedent has played the farmer false; but the conditions differed —the data were not the same. The so-called destructive effects of lime are well known—we mean its property of disintegrating organic matters, whether animal or vegetable, and reducing them to a convenient state to be assimilated by vegetables; and hence one valuable quality which this alkaline earth possesses in an agricultural point of view. Its operation, however, on mineral substances has not hitherto been so clearly studied, or the value of its agency appreciated. Professor Daubeny has directed the agriculturist's attention to the change which caustic lime exercises on disintegrating granite, and his experiments taken conjointly with those of Professor Fuchs, of Munich, and Mr. Prideaux, of Plymouth, may be considered as satisfactorily establishing the fact that caustic lime exercises a most potent agency in liberating alkaline matters from the subsoil, and thus furnishing an element which is absolutely essential to the composition of vegetables.

We need scarcely remark that lime enters as a constituent into the composition of most vegetables, but not in its caustic state, and in proportions, which are exceedingly small in comparison with many other bodies. Were the value of the material alone dependant upon this latter circumstance—namely, of its assimilation—then lime would never be employed with propriety in its caustic state. An analysis of any of the common vegetables which are produced on farms will prove beyond question that only a small portion of the value of lime as a manure can depend on its assimilation, and that we must seek for this value in other causes. If we select wheat as our example, we find that by analysis it yields about three per cent. merely of lime, but something more than twenty-six per cent. of phosphoric acid, and nearly twenty-five* per cent. of potash; and yet, notwithstanding the enormous per centage of the two latter substances, their artificial use to any extent is of very moderate origin. Lime, however, has been employed from time immemorial, and the remarks which are made in the treatise of Professor Daubeny will fully account for its value.

We already pointed out in our last number that the basis on which the theory and practice of manures rest is a correct analysis. Thus, in the case of wheat, seeing the large amount of alkali and of phosphoric acid which this cereal requires to minister to the necessities of its organization, substances containing these materials in a loosely-combined state should be employed as manure.

Thus, we have indicated powdered bones and ashes—the former to supply phosphoric acid, the latter to yield alkali. Without this artificial supply the necessary elements must be obtained by decomposition of the subsoil—an operation that would be facilitated by the employment of caustic lime. In this sense, then, lime may be called an exhausting manure, drawing on the resources of land itself, and unlike guano, bone ashes, compost, &c., and adding but little absolute pabulum to the soil. In the first application of science to the necessities of any art, we require some guarantee that the experimenter's means are fully adequate to accomplish the end proposed; the mind must be satisfied that its speculations are founded on truth—that its premises are tenable—that its sequences have not been hastily deduced. Regarded in this point of view, agricultural chemistry presents many difficulties. Vegetables are long in coming to maturity; the experimenter must be contented to wait patiently for no inconsiderable portion of his life; his investigations can only be partially transacted in the laboratory—he must watch the play of vegetation in the fields. Hence, in addition to the science of a chemist, he should possess the practical knowledge of the farmer, an union of qualities which remains yet to be perfected.

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* Grain and straw together.

Notwithstanding all these disadvantages, the ordinary practice of agriculture has revealed some striking facts in illustration of the chain of causes and effects as regards the food of plants. One of the most interesting of these is the well-known circumstance that wheat—indeed, all grasses—produced in land that has been long manured with guano, is very weak in the stalk. The explanation of the circumstance is easy, it being referrible to the absence in guano of silica, or flinty matter, which is necessary to the substance of the stalk. Here is an interesting sequence traceable to a cause, which should alone be sufficient to inspire the farmer with confidence in the suggestive advantages of chemistry, and should encourage him to push his inquiries still further in the very interesting field.

It has often occurred to us that the chemist would do well to test the efficacy of manures on fictitious soils, the composition of which he knows exactly; then he might make specific soils of silica, alumina, lime, &c., alone or in combination; thus he would fix his data, and form for himself, so to speak, a zero, or starting point, by which all his subsequent experiments on natural soils might be regulated. He would thus, we take it, be enabled to speak with positive confidence on matters that are now but probable, and would reduce to system and regularity the whole theory of manures.

DEPREDATIONS COMMITTED BY GIPSIES.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

Sir, — Having frequently experienced great pleasure, as well as profit, in perusing the various remedies suggested in your valuable periodical for most of the evils incident to agriculture, and being convinced it is only by the extension to its utmost limit, of a full and free communication on every subject connected with the welfare of the agriculturist, that we can attain the position which ensures the greatest amount of good, I have ventured to solicit a corner in your next number, to direct attention to an evil, novel, it is true, in your pages, but long existing as a pest to the community; I allude to the depredation committed by the plundering hordes of gipsies who swarm throughout the country the greater portion of the year; who, placed, as it were, without the pale of society, have no one redeeming point in their character, which would entitle them to our sympathy.

Were their ravages confined to the destruction of game (for which they are sufficiently notorious), the occupiers of the soil, it may be, would have no great reason to complain; but not so, when it is known that an encampment of some twenty or thirty individuals, with a retinue of ten or more horses, are on the outskirts of one's property, for then it amount to a certainty, plunder in every article requisite for man and beast, which either the field, the hedgerow, the stack, or the cattle-shed, can supply is unscrupulously pursued.

Frequently have I known a beautiful piece of grass, laid by for mowing, the owner of which would have been terrified at the idea of his own cattle pasturing it, subjected to spoliation by the animals belonging to those nocturnal depredators; whilst the covering of stacks of every description is thinned out to find litter for them, should the homestead or the cattle-shed be too far from their tents, or too well secured to suit their purpose; and not only the covering, but the roof itself is the object of attack, as being the spot the least likely to lead to immediate detection. Again: the turnip and the potato field are alike attacked by these predatory vagabonds; the latter so cunningly, too, as almost to escape the notice of an unsuspecting observer, their plan being to uncover the plant with the hand, and after taking a portion of the produce, to replace the earth in such a manner as can scarcely be seen in any other way than by the traces of their feet. A system also is pursued of taking corn for their horses, when it approaches maturity, either by plucking the ears, or by so carefully taking root and branch, as would puzzle any but the most practised hand to perform with so little trace of the mischief. The hedgerows too are mulcted for firewood, and for the supply of materials for basket making, clothes-pins, &c., which are hawked about from door to door in the neighbouring villages and towns, giving the women of the party a pretext for pursuing their demoralizing and swindling avocation.

Such are some of the contributions to which the farmer's property is subjected by the parties under our consideration, and hitherto the isolated attempts of individuals to obviate it have proved fruitless: detection, which sometimes has led to conviction, deters not; for the chances (which are ninety and nine of the hundred in their favour) of escaping arise from the strict precaution observed in all their movements, and which those alone can rightly appreciate who have studied minutely their habits. Induced by a strong desire that my agricultural friends throughout the country may systematically unite in the endeavour to prevent evils similar to those mentioned from being increasingly perpetrated, I have ventured to intrude, Mr. Editor, on the attention of the numerous readers of your magazine, sincerely hoping, now the question is set before the agricultural public, it will no longer be suffered to remain a disgrace to our country and a tax on our properties, and that wiser heads will perfect that which I have attempted to move in.

I am, Mr. Editor, yours, &c.,

Newton Abbott, Devon. IGNOTUS.

WEALD OF KENT FARMERS' CLUB.

REPORT ON THE FARMS OF MR. HEWITT DAVIS, MR. MECHI, AND MR. BARNES.

Report read at the monthly meeting, by Mr. Buckland, Honorary Secretary.

Gentlemen, as you did me the honour of appointing me to accompany the deputation from our club to visit the farms of Mr. Hewitt Davis and Mr. Mechi, in connexion with another deputation from the Maidstone Farmers' Club, I feel much pleasure in drawing up for your consideration the following report.

I wish it to be distinctly understood, that I alone am responsible for what is here advanced. At the same time I shall feel greatly obliged to those gentlemen who accompanied me, if they will, after the reading of this paper, favour us with their candid opinion of its contents.

The chief object of our visit, as I understand it, was to notice particularly such points in agricultural management that came under our observation, as might be beneficially practised in the district of the Weald of Kent. Throughout my observations I have endeavoured to keep this object in view. I shall avoid minute details, since our very limited time would admit only of a general view of the leading principles of practice, and their results upon the different farms that we went over.

On Friday, July 18th, we inspected the farms of Mr. Davis, at Croydon, and were met at Spring Park, by that gentleman, who in the most frank and friendly manner explained to us his system of management. Spring Park farm contains, as I understand, about 230 acres, and appears to possess considerable variety of soil. The upper portion is exceedingly poor, having but a thin stratum of vegetable mould, resting on a coarse gravel, several feet thick; the subjacent rock consisting of alternations of red and white sand. The lower portion of the farm is of a much better character, containing considerable clay, and probably no small portion of calcareous matter. The whole of this soil was formerly exceedingly wet, and produced only the most scanty crops. Mr. Davis, however, has succeeded in rendering it sound and dry by draining it four feet deep, at from thirty-five to forty feet asunder. The cost of this operation was 9d. per rod for labour and 25s. per thousand for pipes, two inches diameter, delivered in the field. In addition to draining, the active soil has been very much increased by the use of the subsoil plough, a process that forms an essential part in Mr. Davis's mode of tillage. A considerable portion of the surface of this farm contains a large quantity of gravel, some of it of a very coarse description, and so much does this gravel preponderate in certain places, that the act of ploughing (an operation we saw in practice, turning in dung on a rye gratten eight or nine inches deep with two-horse ploughs) very much resembled cultivating the sea-beach. This gravel is found in some places on the farm running together into a hard concrete rock, a sort of conglomerate or pudding stone, an exceedingly stubborn substance, and frequently comes up within a short distance of the surface, thereby rendering draining, and even ordinary ploughing, extremely difficult. We observed some very large pieces of this rock that had been by great force brought up from beneath.

Upon the whole of this farm we saw good crops of the various kinds cultivated in this part of the kingdom. And what is particularly worthy of remark, considering the unfavourable character of the present season for spring crops in general, we observed in no instance a single failure. The wheat we should estimate at 4½ qrs. to 5 qrs. per acre. Beans, which were somewhat blighted, from 3 qrs. to 4 qrs. Oats, from 6 qrs. to 7 qrs. The peas had been carried, and on this gratten we observed the only weeds on this farm. Upon a poor, loose gravel there was a strong and thriving plant of mangel wurzel, and we noticed in different places some excellent buckwheat.

We next went over Shirley Farm, but a short distance from the former, containing about 60 acres of arable land. The soil is upon the whole much superior to that of Spring Park; but towards the top it is poor and gravelly, adjoining to a barren heath. Here was a strong, healthy plant of swedes, and the heaviest crop of beans I have seen this season, thickly podded all down the stem—say from 5 qrs. to 6 qrs. per acre.

We were next conducted over Haling Park Farm, some two or three miles distant from the others, which Mr. Davis merely superintends. The slope of this farm, looking towards the Brighton railway, lies immediately on the chalk, and the soil is consequently poor and thin. But by deep ploughing and subsoiling, thereby breaking up a considerable portion of the subjacent rock, a much thicker bed of active soil has been obtained, and the crops even through this dry season have maintained a healthy vigour and growth. We observed some very fine peas already harvested and in stack: the crop appeared to have been heavy, particularly for the season, and of very superior quality. On the higher portion of the farm, where the soil is of much better quality, we inspected a splendid piece of oats, that cannot be estimated at less than 9 qrs. or 10 qrs. per acre. There were likewise some very flourishing root crops: the state of the latter is generally a pretty safe criterion by which to judge of a man's farming: if swedes and mangel and carrots are all right, we may infer that other things will not be found all wrong. Of course, this observation will occasionally require some modifications; that is, in seasons like the present, on the stiff heavy clays, you may find the root crops a total failure, but the wheat very good.

Mr. Davis's system of rotation and amount of seed corn are, as nearly as I could ascertain, as follows:—

1st year—Rye or tares; seed sown 1½ bushel per acre. These are sown early in autumn, and folded off in spring in time for

Mangel wurzel, swedes, and turnips. These crops are manured with dung.

2nd year—6 or 7 pecks per acre; oats or barley. Sown with clover only.

3rd year—Clover; mown twice.

4th year—2 bushels per acre; beans or peas. Drills turnips between beans for feed in autumn.

5th year—3 pecks per acre; wheat.

These are the principal facts which I deem it necessary to bring before your notice, in reference to Mr. Davis's system of husbandry; I shall consider their application in reference to this district presently.

On Saturday morning, the 9th of July, we had the pleasure of inspecting the farm of Mr. Mechi, near Kelvedon, in Essex. We were received with the greatest cordiality, and that right hearty good feeling, which, it is hoped, will ever continue characteristic of the British farmer. Here, as with Mr. Davis, there was evinced every disposition to put us in possession of all the facts of the case. The first thing we looked over were the farm buildings, all of which are recent and very substantial erections, put up at very great cost. In the design of a new farmery there is great room for differences of opinion, which will be very much modified by the peculiar taste and views of the proprietor. Mr. Mechi, of course, saves every drop of liquid manure, and has an excellent plan of mixing it with other matters of a highly fertilizing nature. The comfort and health of the cattle, as we might expect, are properly consulted; and the machinery and implements, which are of the most approved modern construction, are well disposed of and secured. The great mistake in this homestead is that it is so very disproportionate to the extent of the farm. Upon this point I think there can be no difference of opinion among practical men. Mr. Mechi's farm consists of 130 acres—the original cost was £3,250, to which has been added, in the shape of buildings and improvements, no less a sum than £5,200. This unprecedented outlay on so limited an area never can, in my humble opinion, be made to bring an adequate return. I think it proper to be thus explicit on this head, since there is great need of improved farm buildings all over the country, and a lamentable waste of manure. But there is no department of rural economy, perhaps, that requires more caution and prudence, that is, if the landlord looks—as unquestionably he ought—to his new erections as a payable investment.

These strictures are quite independent of Mr. Mechi's many other improvements, such as draining, straightening fences, removing hedges and trees, &c.: these things, by which a literal wilderness has been in a few years converted into a beautiful and fertile farm, have no doubt been done in an efficient and economical manner.

The soil upon this farm varies considerably, but it is evidently on the whole of pretty good quality, superior I should say to that of Mr. Davis. Some portions of the land are heavy and well adapted to wheat, beans, and clover. I saw nothing at all approaching to that uniform tenacity which characterises the stiff lands of the Wealds of Kent and Sussex. The clays of Essex are totally different. They become more friable by exposure to air or moisture, and are much easier cultivated.

Mr. Mechi's mode of cropping is rather singular. The whole of his farm is under culture, and he has half of it with wheat every year; the other half being cropped with beans, rye, and vegetables. He sows no oats, considering them a much less payable crop than wheat. Of the latter grain we observed about eighty acres, which must be pronounced upon the whole very fine, averaging, probably, nearly 5 qrs. per acre. The straw was bright, stiff, and tall, with fine large ears. It was drilled in rows about twelve inches apart, and horse-hoed. The seed sown, as I understood, varied from one to two bushels an acre, increasing as the season advanced. A small portion of it was dibbled, but it was difficult to observe much difference. Upon the whole I should prefer the drilled. A few ridges were dibbled with only two pecks to the acre, which was evidently too thin. The plants, however, had tillered astonishingly, and the ears were remarkably heavy. The great tendency to tillering was observable throughout the whole crop, and it was remarkable for standing erect, with uniform length of straw, presenting a very even surface of ears. The beans were considerably blighted, but might yield 3 qrs. per acre. Mr. Mechi had failed in obtaining an early plant of swedes, owing to the character of the season, and the difficulty of getting a good turnip tilth; his mangel however was strong and promising.

I now come to the last, and what is unquestionably the most difficult part of my task—how far is this system of farming, which has been already briefly described, applicable to the district cultivated by the members of this club? I will be as brief in my answer to this important question as possible.

In the first place, gentlemen, in our estimate of Mr. Davis and Mr. Mechi's systems of farming, as applying to our own district, we ought to take into consideration the circumstances under which their operations are conducted. It is not any peculiar rotation of cropping, nor even what is designated thin sowing, that should first occupy our attention; these and other matters will naturally enough fall into their proper places when the conditions of the farm, in relation to soil, and to those great and essential agents, heat, light, and air, are equalised and settled. Both Mr. Mechi and Mr. Davis conduct their farming operations under bright sunshine, unobstructed light, and the freely circulating air. Their first effort, that which formed the very basis of every subsequent improvement, was to uproot hedges and trees, and thus to place their land in the best physical condition for the growth of crops. Now I need scarcely observe that in the Weald of Kent and Sussex we cannot be said to have fairly made a beginning to secure this condition; and until that is done, all considerations of other matters is premature. Every one acquainted with our district is aware how difficult it is in practice to carry out this preliminary improvement. Besides the expense attending it, there is an insuperable difficulty in getting large open fields in some localities, arising from the physical conformation of the surface, broken as it frequently is into narrow ridges and deep gullies, running in different directions. It appears to me that such portions of the Weald must ever remain as small enclosures, and that coppice wood and even timber trees must be as heretofore continued. Hop culture in such situations will, probably, continue the characteristic feature of their agriculture. There is no part of the Weald of Kent, however, but what admits of great improvement in this respect, and I would recommend that the example of Mr. Davis and Mr. Mechi, in removing hedges and trees, should be carried out in our district to the fullest extent, that is really compatible with its peculiar physical condition as it regards the inclination of the surface, &c., the latter, as you know, being by man's art unalterable.

Then, again, as to the nature of the soil, and the cost of ameliorating it, there is a vast difference between this district and the farms to which we are referring. Mr. Davis finds that drains 4 ft. deep laid from 35 ft. to 40 ft. apart, are sufficient to secure a uniform dryness. Now, it must be well known to our farmers conversant with draining, that such a distance is by far too great for our cold wet clays, or even our alternating sands. It is my decided opinion that, to secure a uniform drainage on our clays, the drains ought not to be more than 12ft. or 14ft. asunder; and I would recommend, generally, on such soils, 3ft. deep. With such drainage we might most beneficially adopt the practice of subsoiling. Perhaps the most practicable, because the least expensive, plan on these soils, is what many of us saw the other day at Mr. Barnes's; that is, the liberal use of the mole-plough, followed up by degrees by thorough draining. But here very naturally occurs the important question—who is to defray the expense of these improvements? From what source are the seven or eight pounds an acre, which most unimproved Weald farms require, to come from? This question opens weighty considerations relating to the connection between landlord and tenant; and the protection of the latter by agreement or lease, which cannot be discussed at this time.

Mr. Mechi's system of having one half of his farm with wheat every year, is wholly inapplicable to our district; and I very much question whether even he will be able to maintain it, without suffering a diminution both in quality and quantity of grain, for any considerable number of years. Mr. Davis's rotation I think a much more sound one; and there is one peculiarity of his system worth remembering—he purchases no artificial manure, his farm is self-supporting. And this, in most situations, appears the safest and most natural course for a man to pursue. The great art of the farmer may be summed up in a few words—raising the greatest produce at the least cost, without any permanent injury to the soil.

With regard to the practice of thin sowing, which we observed both at Mr. Davis's and Mr. Mechi's, I am inclined to think that it has not as yet been sufficiently tested on a variety of soils to warrant a safe conclusion. We must remember that last winter was peculiarly favourable for thinly sown corn. I wish, however, to say distinctly, that the wheat we saw both at Croydon and Tiptree appeared to have been thick enough; and in the peculiar condition of that soil, the small quantity of seed sown seemed certainly to have been sufficient. On Mr. Mechi's farm one would have felt sorely puzzled to have said which was the heavier crop of wheat, that from 1 bushel of seed, or that from 1½ bushels to nearly, as I understood it, 2 bushels. The larger quantity of seed, however, it should be borne in mind, was sown at the commencement of winter, the other early in the autumn. One essential condition to the success of thin sowing is to be in time. Upon a calm review of this interesting subject, I am inclined to think, that upon all soils well drained and deeply cultivated, provided they contain a sufficient amount of mineral and organic matter to sustain a healthy vegetation, a considerably less quantity of seed, than is usually sown, would be found in the generality of seasons quite sufficient. But that so small a quantity as 4 pecks of wheat per acre, as practised, and apparently, it must in candour be acknowledged, successfully by Mr. Davis, would, under any practicable improvements, in the Weald of Kent, be found adequate in all seasons, I do very seriously doubt. Experiments carefully conducted, and accurately recorded, carried on upon different soils, and through several varying seasons, can alone, I think, determine satisfactorily this important problem. I may further say, that we saw upon the farm of our respected vice-president at Staplehurst, the other day, quite as good crops of wheat, from much thicker sowing, as we observed on our visit to Mr. Davis and Mr. Mechi; and this too, it should be remembered, on a much less manageable soil. Mr. Barnes's farms afford a pleasing illustration of what our Weald soil may be made to produce, even in the most untoward seasons, by draining, clean and effective culture, and judicious manuring. As, however, the very elaborate report of the Maidstone Club respecting this gentleman's farming, and also that of Messrs. Davis and Mechi, has been given to the public since the foregoing remarks were written, I deem it quite unnecessary for me to add anything more. I will only remark, that in all my experience (and my observations have not been confined to a very narrow space), I never before observed a greater if, indeed, so great a contrast, as I found to obtain between Mr. Barnes's crops, and those of his adjoining neighbours, arising solely, I believe, from a different and much superior system of management. To raise a good crop from a rich fertile soil imposes but a light tax on the resources of a farmer; but to bring up the poor, cold, and hitherto unproductive clays, to beyond the average of the kingdom, is a task that puts to a severe test the skill, enterprise, and capital of the farmer.

I will now briefly sum up what I consider should be the leading principles on which to base an improved agriculture for the Weald of Kent, and thereby to bring out the great latent capabilities of this singularly interesting district.

1st.—The enlargement of our extremely small enclosures, by grubbing the wide hedge-rows, and removing entirely all timber trees from arable fields. This should include the straightening of fences and water courses, the annual clipping of hedges, &c. More than a tenth of the whole arable surface of this district is rendered all but absolutely unproductive by the roots and shade of hedges and trees.

2nd.—The thorough drainage of the land, pasture as well as arable—a mode of improvement more or less required by almost every acre of the Weald.

3rd.—Deep and clean culture, including trenching, subsoil ploughing, drilling, together with horse or hand-hoeing through the spring and summer. The broad-casting of beans and peas in particular is a practice yet far too common, and is one of the greatest drawbacks to the agriculture of the district. A few of the modern improved implements might be introduced very advantageously, but this should always be done cautiously. The patent iron plough, manufactured by Howard, of Bedford, which has taken the head prize at the last two or three meetings of the Royal Agricultural Society, is admirably adapted to this district. It is an implement possessing great mechanical advantages, and performs its work as thoroughly as our well known and esteemed Kentish turn-wrist, with a considerable saving of motive power.

4th.—An extended rotation of cropping. It is, too, of importance, when artificial manures are extensively employed, to apply them in the shape of a compost, sometimes with farm-yard dung, thereby securing a larger number of fertilizing substances, essential as the food of plants. Most of the cereals, particularly wheat, are brought round too quickly; roots, pulse, and artificial grasses, should, in such order as experience determines to be the best, intervene. It is a great evil in Weald farming, to allow hop culture to monopolise attention, manures, labours, and almost everything. The cultivation of this plant might, I think, be reduced advantageously; or at all events it ought not to be allowed to interfere injuriously with the other branches of the farm.

5th.—Proper attention to farm buildings with special reference to the comfort and health of animals, and the making and saving of manure. A farm when once got into good condition, should, when mixed husbandry is pursued, be made in a great measure independent of extraneous manure, or in other words, self-supporting.

6th.—Adequate capital and skill for the thorough working and management of land. It is a mistake too frequently committed everywhere, more especially in wet heavy districts of difficult and expensive management, to get more acres than can properly be cultivated, involving at once a loss to the cultivators and to the public, and ultimately to the landlord, by the certain, although gradual, diminution of the fertility of the soil. The most skilful cultivator should not remain satisfied with present results, and rest upon his oars; an advancing population requires and demands a continually advancing agriculture. Why should farming stand still, while all the arts of life, and all the appliances of civilization, are every day improving?

7th.—A good understand, including mutual confidence and respect between landlord and tenant, secured by agreement or lease, based upon a few well-defined and liberal covenants. Without a provision of this sort, I see no prospect of the great agricultural capabilities of this district being made in any superior degree available. Security of tenure—that what a man sows, he or his children may certainly calculate upon reaping—is the germ of all enterprise and improvement. It is the owners of the soil who should in all these things take the lead, and afford every encouragement to an industrious, enterprising, and improving tenantry.

The importance of these remarks has only been the more powerfully impressed upon my mind by our recent visits to the three celebrated agriculturists to whom I have so frequently referred in this paper. That our native agriculture may continue to flourish, as well as all other of our industrial pursuits, is only what every good citizen must ardently desire. Let there, then, be a unity of feeling and of purpose throughout the entire agricultural community—landlord, tenant and labourer, each striving to advance this important and indispensable art; and with the blessing of heaven, our fields will continue to increase in fertility, and gladden our hearts with the smiles of plenty. In the advancement of such a cause we would devote all our powers and spend all our days. In the words of the immortal bard of the Seasons,

> "Ye generous Britons, venerate the Plough;
> And o'er your hills, and long withdrawing vales,
> Let Autumn spread her treasures to the sun."

A FORM OF MEMORANDUM ON TENANT-RIGHT, TO BE ADDED TO EXISTING AGREEMENTS OR LEASES.

BY BARUGH ALMACK.

The adoption of protective covenants for the improvements of tenants, and the consequent establishment of a custom under which all questions between landlord and tenant should be settled by arbitration, would not only encourage tenants in expenditure upon their farms by giving them a just security for their outlay, but would incidentally afford a means of simplifying and improving the clauses in farm-agreements, as the tenant's claim on account of his improvements would be liable towards the owner for the dilapidations which the tenant might have caused in other parts of the farm; and as I cannot help thinking that many landlords would be disposed to afford their tenants some positive and substantial security, if they could only see a ready and unobjectionable mode of doing so, I will venture to suggest the following one, in case they should not discover a better. The chief plan of it was drawn up about a year ago, and annexed to the end of a form of farm-agreement, as here exhibited; but some changes were made in it by Mr. Pusey in adopting this memorandum for his own estate, and those changes have been introduced here.

Although in several cases the number of years is inserted, it is obvious that the proportions (or number of years for allowance) should be regulated partly by the nature of the materials, and partly by the value of the workmanship. In all improvements, too, their value to the owner must be greatly affected by the probability of their being more or less permanent, and his liability in respect to them should be calculated accordingly.

AND the said and hereby mutually agree that if any dispute shall arise between the said , their executors and administrators, upon the said quitting the said farm, or upon the state of cultivation or condition thereof, such dispute shall be settled by two referees, one named by each party, or their umpire; and in case one party refuse to nominate a referee within ten days after notice has been given in writing by the other party, the referee of the other party alone may make a final decision. If two referees are appointed, they are to nominate an umpire before proceeding to business, and the decision of such referees or umpire, as the case may be, shall be final.

Witness the hands of the parties. A. B.
C. D.

MEMORANDUM.

In order to encourage the tenant to cultivate the farm in the highest possible manner, the said hereby engages on behalf of himself and his representatives, owners of the farm* let to the said *on condition* of the foregoing covenants having been fulfilled and kept by the said his executors or administrators, that in case of the death or incapacity of the said or of his having received notice to quit the said farm, and quitted it agreeably to and in consequence of that notice (*or in case of the expiration of the term of a lease for years*), the said or the incoming tenant will allow to the said or his executors, administrators, or assigns, for such improvements made on the said farm subsequent to the date of this memorandum, and within the stated periods, before quitting, as are contained in the following list, and are marked and enumerated with the figures. that is to say, so much of the amount of such expense as shall be in the given proportion in each case to such a number of years as the said his executors, administrators, and assigns, shall fall short in the occupancy of the said farm after incurring such expense, *it being expressly stipulated that the tenant is to give an account each year* of such outlay as he proposes to make in matters of *durable* improvement, in order to obtain the owner's sanction to the proposed expense, *such sanction being necessary in order to claim or be entitled to any allowance* from him, and shall also render an account of such disbursements within each year: such account to be examined and signed by the landlord or his accredited agent, and to serve as a voucher for the sums so to be recovered by the said tenant; and that non-payment of rent (if the same shall have been demanded and have afterwards remained unpaid for the space of six months) or non-fulfilment of covenants shall *forfeit* any claim or right to such allowances for improvements.

The proportion of the proposed conditional allowances to be regulated as follows:—

DURABLE IMPROVEMENTS.

1. If the tenant drains the land at his own expense, with the consent and subject to the inspection of the landlord or his agent, an allowance to be made for the materials and workmanship for [*eight to fourteen years, as the case may be*] years, so that the allowance shall yearly diminish in equal proportions, and be cancelled by years' enjoyment of the improvement.
2. For lime used on the land, with like sanction, the allowance to extend in like manner for *four* years.
3. For marl or chalk used on the land, with like sanction, the allowance to extend in like manner for *eight* years.
4. For clay used on the land, with like sanction, the allowance to extend in like manner for [*six to eight*] years.
5. For buildings erected on the land, with like sanction, the allowance to extend in like manner for [*twenty*] years.

TEMPORARY IMPROVEMENTS.

6. For bones used on the land, the allowance to extend in like manner as to diminishing for *three* years.
7. For bought dung and night-soil used on the land, the allowance to extend in like manner as to diminishing for years.

8, 9, 10, 11, 12, 13. Other manures, as the case may be.

14. For linseed cake used for feeding cattle or sheep on the land or premises, the allowance to be one-third of the cost for the first year, and one-sixth for the second year.

A. B.

In considering this form, it is necessary to bear in mind that it was drawn up at a period when there seemed to be less probability of low prices for agricultural produce than now: that it was drawn up with the feeling that, as a land-agent, I was bound to protect the interest of the landowner, and therefore, if possible, to do the tenant justice, without risking any loss to the owner. Thus it may be considered less favourable to the tenant than *some* of them, under present circumstances, would think necessary. If landowners can induce tenants to lay out their capital in judicious improvements, under this form of covenants, they may be considered as fortunate in having tenants so liberal. As this may be seen (and I hope will) by landowners, land-agents, and tenants, I shall be greatly obliged if any of them will point out a better means of accomplishing the object in view, namely, benefiting all parties without injuring any of them, by such arrangement.

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* These words are thus limited to the future *owners* of the farm, in order to prevent the charge upon the land from applying to the personalty of a deceased landlord, which may have been devised by him to parties other than the successors to his real estate; but at the same time it must be fairly stated that a doubt may arise how far the owner of a settled estate is empowered, in the present state of the law, to bind the heir of his land, especially for money laid out in building, though I am not aware that in Lincolnshire, where the *custom of the country* sanctions such charges for other permanent improvements, any difficulty has ever arisen as to their validity.

The form appears to possess the following advantages:—

First. It may be attached to almost any agreement as at present existing; although it is very important for all parties, and for landowners as much as any, to see whether old agreements cannot be altered so as to benefit tenants without any, even temporary, loss to owners.

Secondly. It may be made the most effectual means of binding the tenant to the due observance of his present agreement.

Thirdly. It will secure the owner against any *probable* negligence on the part of the tenant, as regards expenditure in improvements, inasmuch as the tenant *may have* to pay for the whole if he should live, and the owner not choose to take them off his hands.

The owner need not, except in case of death or incapacity, take them off the tenant. He would therefore, as a general rule, be certain of a new tenant, who would take upon himself the specified responsibilities before he parted with the old one. In the cases of durable improvement, which involve the heaviest outlay, the responsibility on the owner would be voluntary, and therefore he could not be injured without becoming himself a party to it.

The responsibility really amounts to nothing if the owner has taken care to place his estates under the management of an agent capable of judging what would be improvements; because he would only have to pay for part of what he had got; and, in such case, if there were no improvements, there could be none to pay for.—Journal of the Royal Agricultural Society.

23, Alexander-square, Brompton,
near London.

DRAINAGE OF THE LAKE OF HAARLEM.

At a time when every improvement in the art of draining, reclaiming, and irrigating land is an object of national importance, we have the pleasure of laying before our readers a sketch of the origin and progress of the drainage of the lake of Haarlem by the Dutch Government; a work which stands unrivalled in the history of hydraulic engineering.

At the commencement of the sixteenth century, a number of small lakes occupied a large portion of the Province of South Holland, lying between the towns of Amsterdam, Haarlem, and Leyden. Four of these lakes, lying contiguous to each other, covered an area of about 15,000 acres; gradually the barriers of soft alluvial soil that separated them were destroyed by the action of the waters, and the four lakes became merged in one. The degradation of the shores still continued, until, at the commencement of the eighteenth century, the waters covered an area of 45,000 acres, with an average depth of 13 feet below low water in the Zuyder Zee. This lake constitutes what is now known as the Haarlemmer-Meer. The people of Holland saw with much alarm the rapid extension of its boundaries, and, at an expense of about £33,000, succeeded in partially arresting its progress; but the annual cost of repairs of the works of defence have for a considerable period amounted to between £3000 and £4000. Many projects were proposed for draining the lake, but political and financial causes, and the magnitude of the interests concerned, prevented the execution of any of these plans.

At length, on the 9th of November, 1836, a furious hurricane from the west drove the waters of the lake upon the city of Amsterdam, and drowned upwards of 10,000 acres of low land in the neighbourhood. On the 25th of December following, another hurricane from the east drove the waters in the opposite direction upon the city of Leyden, the lower parts of which were submerged during forty-eight hours, and 19,000 acres of land were inundated. The enormous loss occasioned by these two storms induced the Government to determine on the drainage of the lake; a credit of 8,000,000 florins was voted by the States-General; and in May, 1840, the king, William I, appointed a commission, composed of eleven members, to superintend the work; their number was subsequently increased, in 1842, to thirteen, under the presidency of M. Gevers van Endegheest, whose father, in 1806, presided over the directorial commission for the well-known great canal and sea-sluices at Katwyk, by which the surplus waters of the lake were provided with an outlet to the North Sea. Thus father and son will have had the honour of presiding over two of the greatest hydraulic works of modern times. Since 1839, a canal has been cut round the lake to isolate it from the neighbouring waters, and to afford the means of navigation to the enormous traffic which has hitherto passed over the lake, amounting to 700,000 tons per annum. This canal is 37_3 miles long, 130 feet wide on the west side, and 115 feet on the east side of the lake, with a depth of 9 feet of water. On the side next the lake, the mouths of all water-courses entering it have been closed by earthen dams, having an aggregate length of 3000 yards, made in 10 feet depth of water.

Other great works have been executed by enlarging the sluices at Katwyk on the North Sea, and at Spaarndam on the river Y, at the base of the Zuyder Zee, where an auxiliary engine of 200-horse power has been placed to assist in discharging the water from the canal during the time of high water.

The water of the lake has no natural outfall, being below the lowest practicable point of sluiceage. The area of water enclosed by the canal is rather more than 70 square miles, and the quantity to be lifted by mechanical means, including rain water and springs, leakage, &c., during the time of drainage, is estimated at probably 1,000,000,000 tons.

In determining the motive power to be employed, two points were to be kept in view: first, the cost of evacuating the lake; secondly, the cost of annual drainage; for, when once drained, the site of the lake can only be kept dry by mechanical power. The annual drainage will probably amount to 54,000,000 tons of water, to be lifted on an average 16 feet; but it may occur that as much as 35 millions of that amount must be discharged in one month.

With the exception of a few small steam-engines, the wind has hitherto been the motive-power employed to work the hydraulic machines used in the Netherlands to keep the country dry. And the power of 12,000 wind-mills, having an aggregate average power of 60,000 horses, is required to prevent two-thirds of the kingdom of the Netherlands from returning to the state of morass and lake, from which the indomitable energy and perseverance of the Dutch people have rescued what is now the most fertile country in Europe.

In 1840, it was found that the average consumption of coals by the steam-engines used in England and Holland for draining land, *was 15lbs. per net horse-power per hour.*

The Haarlemmer Meer commissioners were convinced that the old means must be put aside, and new ones adopted to suit the magnitude and peculiarities of their work. Accordingly, they determined to erect three gigantic steam-engines (from the designs of their engineers, Messrs. Joseph Gibbs and Arthur Dean, of London) of a peculiar construction.

The first of these engines, called the Leeghwater, was completed last year, and has been experimentally worked during several months. The result has been most satisfactory to the commissioners—the consumption of coal has been reduced *to two and a half pounds per horse power, per hour, or one-sixth part only of the average consumption of the ordinary draining engines.* Nor has the performance of the engine, as regards the quantity of water lifted, been less successful; it will raise 112 tons of water 10 feet high at each stroke, and is capable of discharging 1,000,000 tons in 25½ hours.

It is impossible to foresee the future results of this great improvement in the economy of the steam-engine for lifting great bodies of water to a comparatively small height; it will completely revolutionize the present system of drainage in the Netherlands; and in the south of Europe and the tropics may be productive of enormous benefits, if applied to the irrigation of lands bordering the rivers, which, in the dry season, are frequently ten or twelve feet below the level of the surrounding country.

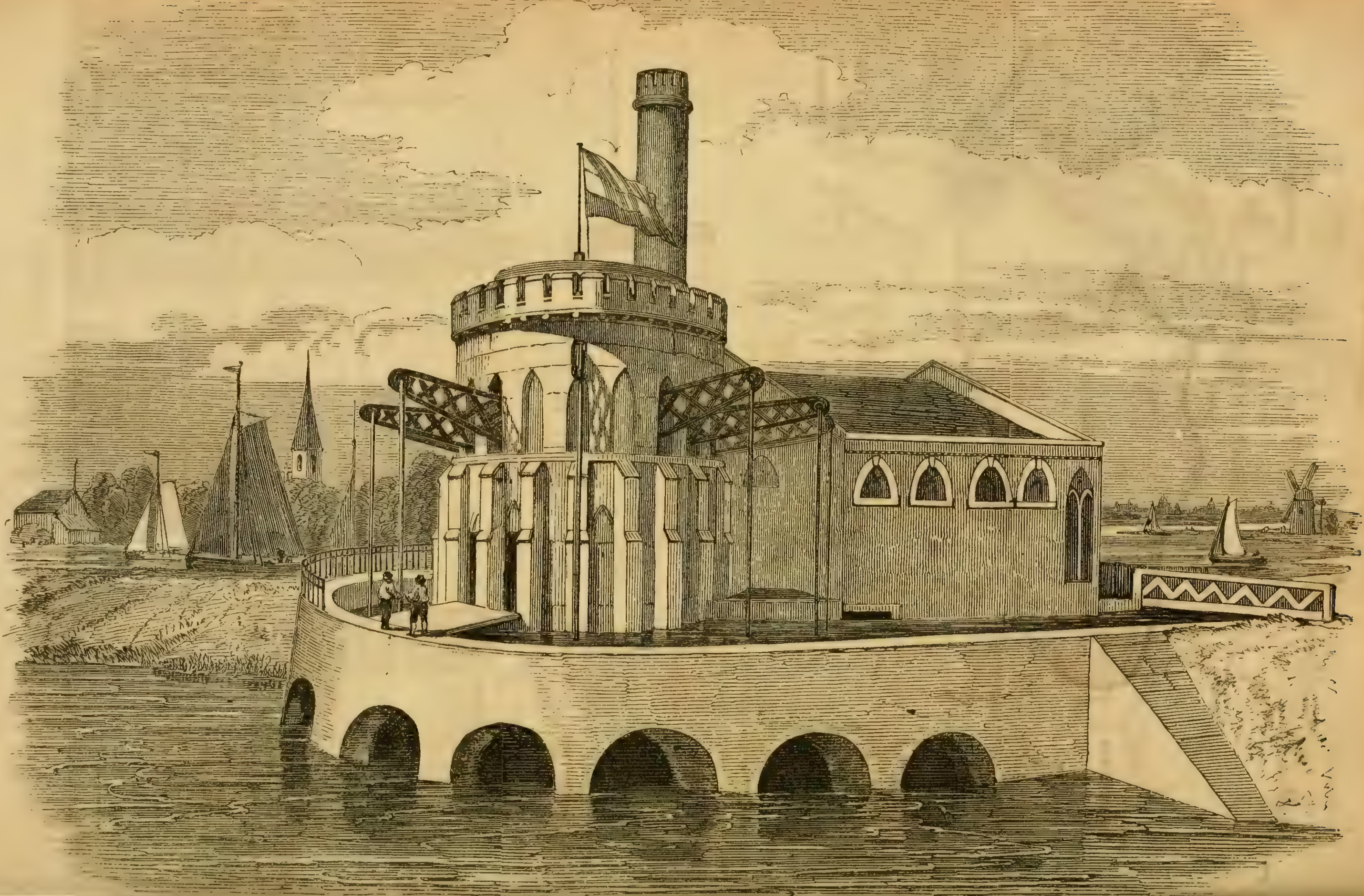
A short description of the Leeghwater Engine may prove interesting to our readers; we have therefore engraved a diagram of the engine and pumps. It has two steam cylinders, one of 84 inches diameter (A), placed within another of 144 inches diameter (BB); both are fitted with pistons, the outer piston is, of course, annular; and the two pistons are united to a great cross-head, or cap (C), which is furnished with a guide-rod, or spindle (*c*); both pistons and cross-head are fitted with iron plates, and together, with parts of the engine attached, have an effective weight of nearly 90 tons.

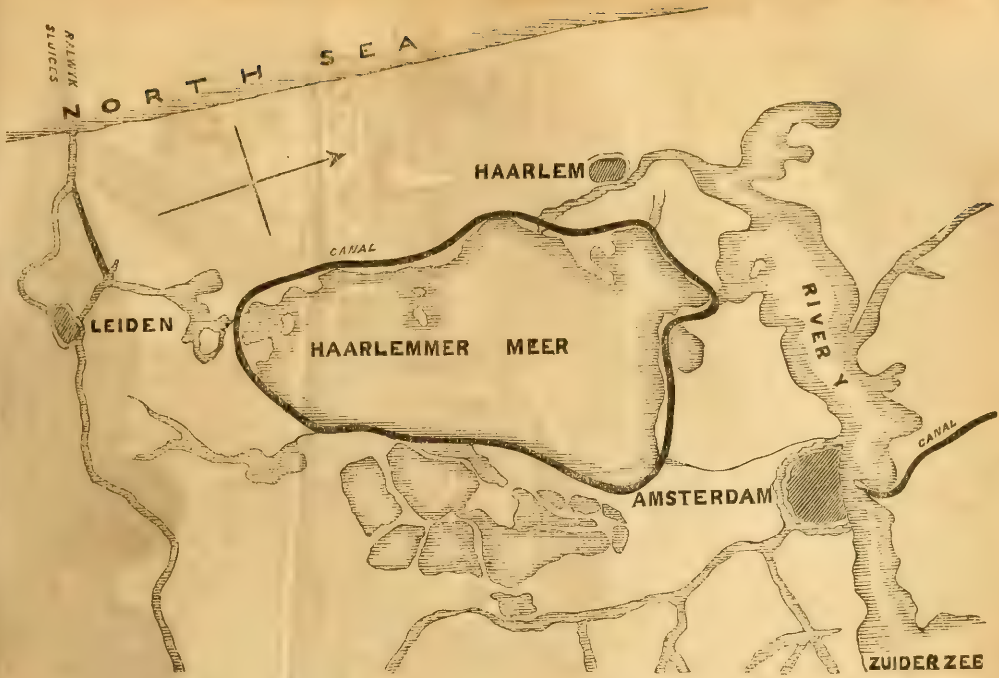
The engine-house is a circular tower, on the walls of which are arranged 11 large cast iron balance-beams, which radiate from the centre of the engine. Their inner ends, furnished with rollers, are brought under the circular body of the great cap, and their outer ends are connected to the pistons of 11 pumps of 63 inches diameter each; the stroke of both ends is 10 feet; and the discharge from the pumps 66 cubic metres, or tons, of water per stroke.

The action of the engine is very simple, it is on the high-pressure-expansive-condensing principle.

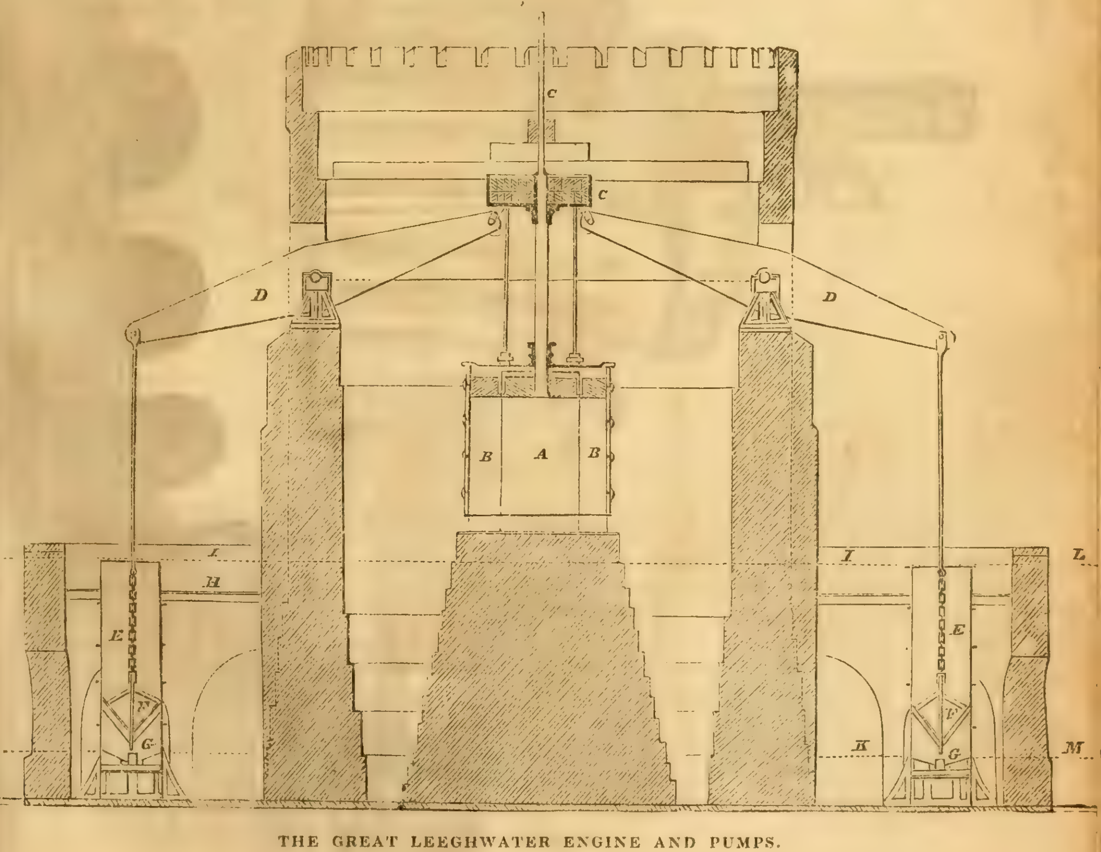
The steam is admitted first beneath the small piston, and the dead weight of 90 tons is lifted, carrying with it the inner end of the pump balances D, and of course allowing the pistons to descend in the pumps E.

The equilibrium valve then opens, and the steam in A passes round to the upper surface of the small and annular pistons; puts the former in a state of equilibrium, and presses with two-thirds of its force upon the annular piston, beneath which a vacuum is always maintained—thus, the down stroke of the engine, and the elevation of the pump pistons (F) and water, is produced by the joint action of the





THE LAKE OF HAARLEM.



THE GREAT LEEGHWATER ENGINE AND PUMPS.

descending dead weight in the cap and pistons, and the pressure of steam on the annular piston.

The steam is expanded from six to eight times its original volume.

The engine has two air pumps, of 40 inches diameter, and 5 feet stroke each.

The water is lifted by the pumps into the canal H, from which it passes off towards the sea sluices.

The total weight of iron employed for the engine, pumps, &c., is 640 tons.

The cost of the machinery and buildings, £36,000.

Two other engines of equal size and power are now being constructed by Messrs. Harvey, of Hayle, and Messrs. Fox and Co., of Perran, in Cornwall, who also manufactured the Leeghwater; no higher encomium can be passed upon those establishments, than the simple fact of their being entrusted with the manufacture of these, the three largest engines in the world.

The united action of the three engines will discharge about 2,800,000 tons of water per twenty-four hours; and, allowing for contingencies, the lake will be pumped out in about 400 days, at a total cost, including the price of the engines, buildings, &c., not exceeding £140,000. By the old system of steam-engines the cost would have exceeded £240,000; and to do the same work in four years by wind, would require 114 first-class windmills, at a cost of £308,000. The annual cost of keeping the lake drained by wind would have been £6,100; by the old system of steam-engines. £10,000; and by the improved system, will be £4,500.

Holland, like England, is now turning its attention to the useful employment of the sewage water of its towns.

The Haarlemmer Meer commissioners, having "gone a-head" in steam matters, are now considering a plan for using the waters of the towns of Amsterdam, Haarlem, and Leyden, for the purpose of irrigating the "Polder," or bed of the lake, when drained.

It is worthy of remark that it would be almost impossible to carry out this project for irrigating 45,000 acres had the old and expensive system of steam-engines and hydraulic machinery been employed in draining the lake; for the coal cost alone, for the engines to lift the waste sewage water out of the "Polder," would amount to £13,000 per annum, whereas by the system adopted in will only be £2,200.

The foregoing particulars are, of course, only a faint outline of the various features of this great work; we shall, from time to time, furnish our readers with further particulars of its progress.—Illustrated London News.

COURSE OF LECTURES ON BOTANY IN REFERENCE TO AGRICULTURE.

BY CHARLES JOHNSON, ESQ., PROFESSOR OF BOTANY AT GUY'S HOSPITAL, &C., &C.

AT MESSRS. NESBITS' AGRICULTURAL AND SCIENTIFIC TRAINING SCHOOL,
KENNINGTON LANE, LAMBETH, NEAR LONDON.

INTRODUCTORY LECTURE.

We commence this day a series of lectures on botany, not as an abstract science, but as one intimately connected with various branches of human economy, and more especially with that which, as it ever has been, so it must continue to be, of the utmost importance to mankind, viz., the cultivation of the earth, the prime source of our civilization, and of almost every art that ministers to the elevation and improvement of society. Itself an art of the highest antiquity, agriculture must always have been one of progression; more or less simple in its practice at the first, observation and experience season after season suggesting new plans of operation, new means of improving or maintaining the fertility of the soil, and of guarding against those casualties that in every country and climate affect the productiveness of the crop. The success—sometimes, perhaps, rather fancied than real—of one experiment led to the institution of others, and thus the pursuits of the husbandman, originally followed without rule, and precarious in their results, were by degrees brought to a state of perfection and fixity of purpose that elevated the art to the science, the mere labourer to the philosopher. Such has been its progress in all ages among all nations. But to advance beyond a certain point, the cultivator of the earth must extend his sphere of information, must seek the aid of other sciences, possibly of those which, from imperfect acquaintance with their objects, he has hitherto regarded as completely isolated from his own. So mutually dependent are the laws and operations of nature upon each other, such her unity of action, that to confine ourselves to any branch of knowledge abstractedly is folly, wilful blindness: learn all you can, and you will not keep it seven years without turning it to some useful purpose. We are advancing in our estimation of these things daily; and you whom I now address will stride, I trust, not one, but many steps beyond your fathers in the great work of improvement, whatever may be the duties of your after life. A high-class farmer of the past generation would have ridiculed the idea of his son and intended successor being taught at school the rudiments of chemistry and natural philosophy: they might, indeed, be very useful to a manufacturer, but quite superfluous in his case. As to botany, he would regard it as downright nonsense. Not thirty years back, I knew a gentleman, residing in one of the best-cultivated districts in England, who had the reputation among his poorer neighbours and dependants of dabbling in magic, and among those of his own grade, even the best informed, was looked upon with a sort of pity as a monomaniac; simply because, being a man of some scientific acquirements, he was labouring by rational means to enhance the value of his own property, and suggest improvements to those around him: had written a book on the natural history of his native county, employed his leisure from other pursuits in analyzing, in a small, well-furnished laboratory, the subsoil of his own and his neighbours' fields; assiduously cultivated patches of all sorts of weeds, exotic and British grasses, &c., with a view to the best means of exterminating the former and ascertaining the value of the latter, in a plot of ground set apart for the purpose; and, more wonderful than all, sought to discourage poaching by turning away his gamekeeper and neglecting his preserves. The prejudices against new methods of cultivation are now quickly subsiding, in proportion to the diffusion of general knowledge: the numerous agricultural and horticultural societies that have successively started into existence in this country, the increasing numbers of their members, and interesting character of their meetings, all evince that a spirit of inquiry is extending its influence among our rural population, no less than among our manufacturers and merchants, the results of which it is at present difficult to speculate upon, but the general cry is, "Forward, forward." In Great Britain every movement of the kind has been hitherto due to the energy of private individuals and the ready response of an industrious and enterprising people; but on the Continent—in France, Prussia, and most of the German states—public schools, under the auspices of the governments, and established by them, are open for the education of youth in this important department of human economy, furnished with professors in the auxiliary branches of science, as chemistry, botany, geology, &c., and with all the essentials requisite for combining theory with practice. The advantages already derived to the states in question from these establishments have been sufficient to prove the value of the extended system of education they have afforded; and old prejudices are universally disappearing as their pupils become distributed through the provinces, carrying with them the more unbiassed views and openness to conviction which are the natural results of a liberal course of instruction.

The value of botany, as a practical science, is not so well appreciated in this country as it is abroad; and this simply because the attention of our practical men has not been hitherto sufficiently directed to it, nay, has even been averted in consequence of the very general prejudice that it is better fitted for a plaything than a tool; a notion—I will not call it an opinion—that originated, very naturally, from the superficial manner in which its study was followed in this country by most of those who aspired to rank among its votaries, even so recently as twenty years ago. It was then little more than the art of distinguishing one plant from another, of allotting to each its learned name and place in an arbitrary system of arrangement, and, sometimes, of adding to these capabilities a remembrance of the qualities of those used as food or medicine. Now, to use the words of a modern writer, one of its most able and industrious professors, "it comprehends a knowledge not only of the names and uses of plants, but of their external and internal organization, and of their anatomy and physiological phenomena; it embraces a consideration of the plan upon which those multitudes of vegetable forms that clothe the earth have been created, of the skilful combinations out of which so many various organs have emanated, of the laws that regulate the dispersion and location of species, and of the influence that climate exercises upon their development; and, lastly, from botany, as now understood in its most extensive signification, is inseparable the knowledge of the various ways in which the laws of vegetable life are applicable to the augmentation of the luxuries and comforts, or to the diminution of the wants and miseries of mankind. It is by no means, as some suppose, a science for the idle philosopher in his closet; neither is it merely an amusing accomplishment, as others appear to think: on the contrary, its field is in the midst of meadows, and gardens, and forests, on the sides of mountains, and in the depths of mines; wherever vegetation still flourishes, or wherever it attests, by its remains, the existence of a former world. It is the science that converts the useless or the noxious weed into the nutritious vegetable; which changes a barren, volcanic rock like Ascension, into a green and fertile island; and which enables the man of science, by the power it gives him of judging how far the productions of one climate are susceptible of cultivation in another, to guide the colonist in his enterprises, and to save him from those errors and losses into which all such persons unacquainted with botany are liable to fall. This science, finally, is that which teaches the physician how to discover in every region the medicines that are best adapted for the maladies that prevail in it; and which, by furnishing him with a certain clue to the knowledge of the tribes in which particular properties are or are not to be found, renders him as much at ease, alone and seemingly without resources, in a land of unknown herbs, as if he were in the midst of a magazine of drugs in some civilized country."

This department of science, which is now becoming a subject of general interest, in consequence of the new views of the economy of nature in her development of organic being, that have been obtained by a deeper insight into vegetable anatomy and physiology, cannot but be more especially valuable to those whose pursuits are so intimately connected with the objects of its study, the cultivators of the soil. There may be, doubtless there are still, many such as those of which we have previously spoken as existing thirty years ago, who, in the pride of their ignorance, may laugh at and despise the lessons of the theorist as opposed to old practices, the result of the experience that has been handed down from their forefathers; until wakened to slow conviction of their importance by the success of their more enterprising neighbours, and then deplore the time they have lost, and which others have occupied in the steady progress to improvement. The views of the merely scientific man may often, it is true, be only speculative; they may sometimes be in direct opposition to facts, of which he has himself no direct means of becoming acquainted. But who is to test the value of his experiments, unless the man of practice? He alone, in his broader field of inquiry, is competent to detect in their action the errors in minutiæ that have escaped the notice of the chemist in his laboratory, and the naturalist in his closet: he chiefly is to derive the benefits accruing from their united labours; and a knowledge of the leading principles of their science and of natural philosophy in the aggregate will materially assist, nay, is absolutely necessary to qualify him for both the trial and the benefit. It is surprising that the very evident advantages to cultivation that an acquaintance with the structure and vital functions of vegetables promises, should have hitherto been so little estimated by the agriculturist: the practical gardener has far anticipated him in the pursuit of inquiries equally essential to them both; although, perhaps, himself in the main, still very distant from acquaintance with a vast body of facts that might be rendered available by his skill. How much, for instance, has a knowledge of the organs and attributes of the flower contributed to the advancement of his art? Let us look at a flower: it is really a complicated object; much more so than many who have long admired and cherished it for its beauty and fragrance have any idea of; or, if they have, have not thought worthy of examination. Its greatest beauty consists not in the gorgeous colour, nor its value in the most exquisite odour, but in the admirable adaptation of its parts, and their subservience to the reproduction of its kind.

Take any common flower of the field or garden, only observing that, if one of the latter locality, it is not of the kind called "double," which, however admirable as garden ornaments—and not altogether to be despised by the botanist, on account of the illustrations they afford him of the morbid development of parts to which the individuals of the vegetable kingdom are liable under peculiar circumstances—are not at all calculated to display the unity of design that constitutes the chief object of interest in a perfect flower. Externally, investing the base of the flower, is a series of small leaves, usually of a green colour, and from three to five in number, separate, and spreading, as in the buttercup and the pæony, or connected into the form of a cup or vase, as in the primrose and pink: this is the *calyx*, or flower-cup; it covers the rest of the flower in the state of bud, and serves to support and hold together the more delicate internal organs when expanded. Within the calyx is the *corolla* or blossom, composed of leaves, generally of the same number as those of the calyx, which are either white or variously coloured, and called *petals;* these are either distinct, as in the rose and the wall-flower, or connected, as in the foxglove and potato-flower. Within the corolla are the *stamens*, generally thread or wire-like processes, with yellow, or, occasionally, purplish or reddish tips; these are very variable in their size, length, and number, in the flowers of different plants; some flowers have only one or two stamens—in the bell-flower there are five, in the tulip six—and in some others they are too numerous to be counted. The stamens surround the *pistil*—so called from the Latin word *pistillum*, a *little pillar* or *column*, or, by a more homely interpretation, a *pestle:* look at the pistil in the flower of the lily; at the lower extremity, where attached to the flower, is a thickish, green body, called the *germen*, or *ovary*, from containing the rudiments of the seeds; the long wire-like part in which this terminates is called the *style*, and the knob at the extremity of the style is named the *stigma.* Look at the pistil of the tulip; in that the germen is long and three-sided, bearing the curiously three-parted stigma on its summit, and the style is wanting. The pistil is not always solitary; in many flowers there are two, three, or more together; and they are frequently very numerous, as in the common buttercup, where the many little green, pointed grains in the centre of the flower are so many pistils. See Fig. I; *a* the calyx; *b* the corolla; *c* the stamens; *d* the pistils.

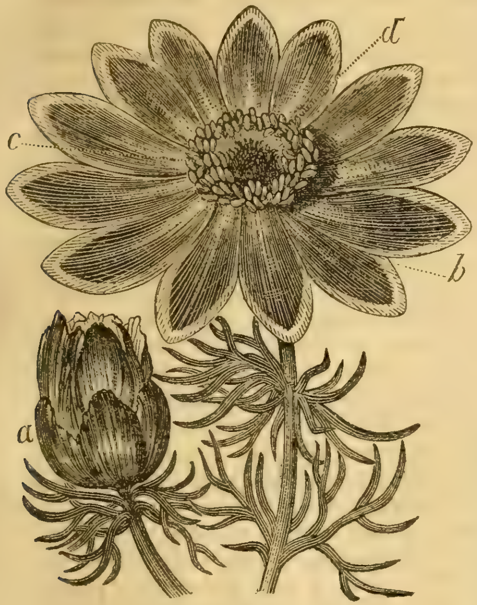


FIG. 1.—Structure of Flowers.

In most of the higher orders of plants, all of these parts are present in the perfect flower; and sometimes other appendages, of which we may speak hereafter; but in some there is no corolla, in others neither corolla nor calyx, and in many the stamens and pistils occupy distinct flowers--all very important characters in distinguishing one family of plants from another, and especially deserving of the attention of the cultivator.

Of all the parts or organs of the flower, the stamens and pistils are the most essential. The stamen is a very curious body; the lower part, called the *filament*, from its resemblance when very slender to a thread or hair, is frequently absent, the coloured tip being attached to the corolla or some other part of the flower; this tip, denominated the *anther*, is a little case or box, usually double, opening at a certain period on each side, and scattering an exceedingly fine powder, called the *pollen*. The forms of the anther are various, and likewise the modes of opening. (See fig. 2).

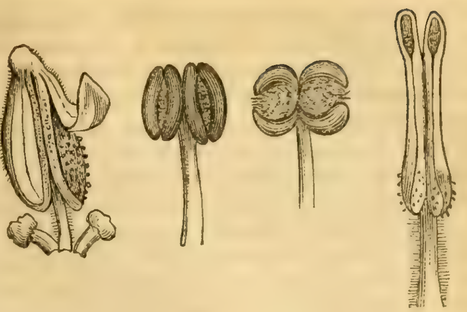


FIG. 2.—Different Forms of the Anther.

Thus sometimes, and indeed most frequently, the opening is by a longitudinal slit the whole length of the anther; in many instances it is a small pore or perforation at the extremity, and in others it takes place by a little door or valve turning upwards, as shewn in our figures.

The grains of pollen are very beautiful objects for the microscope, under which they present a great diversity in size, form, and structure. (See fig. 3).

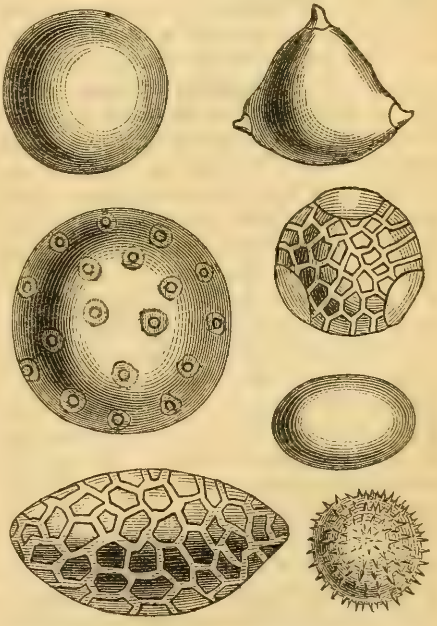


FIG. 3.—Grains of Pollen magnified.

The pollen is an agent of vast importance in the economy of the vegetable kingdom; the maturity of fruit and the production of seed being dependent upon the contact of these minute bodies with the stigma or summit of the pistil. About the period at which the anthers burst and scatter the pollen, the surface of the stigma is seen to be moistened by a viscid secretion, that, occasioning the adherence of such grains as light upon it at the moment of dispersion, so acts likewise upon them as to stimulate the ejection of one or more slender tubes from the surface of each individually; which tubes, extending more or less according to the length of the pistil, penetrate through its tissue until they reach the interior of the germen and come in contact with the embryon seeds. In the event of this contact not taking place, the seed becomes abortive; and hence in many seed-cases, as in those of the common pea, we find only two or three perfect seeds, instead of nine or ten, perhaps, whose rudiments were present. The grains of pollen, examined by a very high magnifying power, are found to consist of a membrane, inclosing a fluid, in which an infinite number of excessively minute particles are seen in active motion; these contents are eventually discharged through the tube, the grain being left empty. The figures in the 4th wood-cut are intended to illustrate this action of the pollen tubes; of the two larger ones, that with the trianguler pollen represents it as taking place on the stigma of the common evening primrose; the other, the descent of the tubes through the stigma and parts of the style of the great snapdragon or calve's-snout. This curious process was unknown to naturalists until recently, though the influence of the pollen in the fertilization of the seed seems to have been understood in relation to certain plants from a period of great antiquity, especially some of those in which the stamens and pistils are produced in different flowers, and occasionally on different individuals, whose male and female attributes must have been recognised by the cultivator before success could have attended his labours. As a striking instance, we may refer to the date, the staple food of the nations of the Arab stock from time immemorial. The date-tree is a kind of palm growing abundantly in the sandy and rocky districts of Persia, the adjoining provinces of Western Asia, Arabia, Egypt, and Northern Africa, and is largely and assiduously cultivated by the inhabitants. A forest of dates is a magazine of provision for a city, and the failure of a crop spreads depopulation through whole provinces; the quantity of fruit yielded by a single tree in each season is, on the average, from two to three hundred weight; every village has its plantation, and even the splendid city of Zenobia derived its Roman name of "Palmyra," and its Arabic and scriptural appellations of "Tamor" or "Tadmor" in the desert, from the groves of dates by which it was from necessity surrounded. These plantations are, of course, chiefly of the trees with pistil, or fruit-bearing flowers; but in order to ensure a crop, the natives are accustomed to gather the large bunches of flowers from the male dates, about the time at which the stamens are ready to scatter their pollen, and suspend them over the others; nay, to guard against an adverse season, they lay by stores of pollen from year to year. This "marriage of the palms," as it is called in the figurative language of the East, is a festival of too early origin to be recorded even by tradition. So well is the necessity of the process understood even by the wildest of the wandering and predatory tribes, that in carrying war into the lands of their neighbours, they frequently cut down the stamen-bearing dates as the most dreadful vengeance they can inflict. Some idea of the importance of the act may be gathered from the statement of Kæmpfer, that the threat only of so doing once put a stop to an intended invasion of a then very formidable power: he mentions, "I remember it happened in my time that the Grand Signior meditated an invasion off the city and territority of Bassora, which the prince of that country prevented, by giving out that he would destroy all the male palm trees on the first approach of the enemy, and by that means cut off from them all supplies of food during the siege."

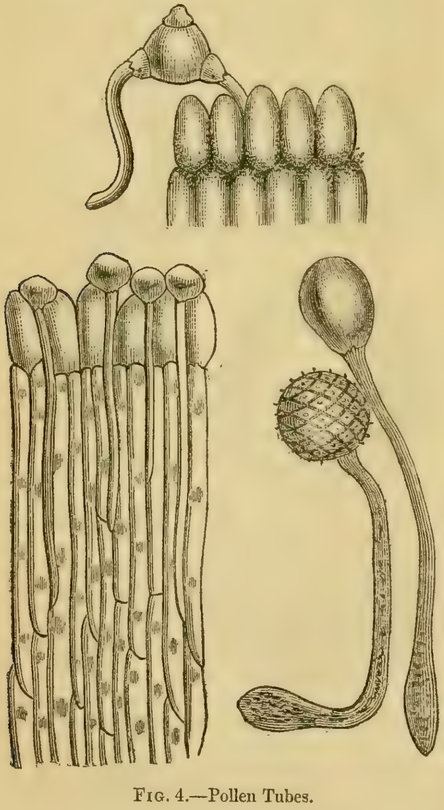


FIG. 4.—Pollen Tubes.

This principle in cultivation, so long understood and made available in that of the date, was afterwards found to be applicable in the nurture of all kinds of flowering plants: of the experiments by which it became established beyond the reach of controversy, or of the means by which our present knowledge of the important fact has been acquired, it is unnecessary for us now to inquire; however interesting the detail, we must wave it for the consideration of the result, viz., the vast power that knowledge has placed in the hands of civilized man, to multiply and enlarge these sources of food and luxury which he derives from the vegetable kingdom, and to which the plasticity of nature seems scarcely to have assigned a limit. The almost endless varieties exhibited among our cultivated plants, whether in root, or leaf, or flour, or fruit, or seed, have all their origin in the reciprocal action of the stamens and pistils; nature herself has contributed many, but man has far outstridden her slow progress. The bee in passing from flower to flower carries away stores of pollen destined to form the waxen fabric of his dwelling, and deposits stray particles adhering to his wings and body upon the pistils of others of a different kind; while numerous small flies and beetles are occupied, in their search for food, in impregnating in a similar manner the seeds of one plant with the pollen belonging to another. Hence the uncertainty attending the preservation of cherished varieties of annual plants in cultivation. When the gourd known by the name of "vegetable marrow," was first introduced into this country, I received some seeds of a very fine variety brought from the continent, and celebrated there for the large size and luscious character of the white fruit: for several years no deterioration was observable; but having sown one season some of the seeds belonging to one large "marrow" fruit reserved for the purpose, my surprise was great to find, when the plants came into bearing, no fewer than three different varieties of gourds were the produce of different individuals, all of them totally unlike the original. This apparent anomaly was afterwards explained away by the fact that, while my vegetable marrow was flourishing on one side of a high wall, my neighbour had trained a pumpkin and an orange gourd on the opposite; and the reserved fruit must have had its seeds fertilized by the pollen of both of them, and of some other species or variety brought by the bees or other insects from a greater distance. These freaks —if we may so term them—of Nature are not only productive of occasional loss and disappointment to the cultivator, but even of much greater evil, as evinced by a circumstance recorded by Ray to have taken place a short time previous to the promulgation of the discoveries of Sir Thomas Millington respecting the functions of the flower. It appears that a market-gardener of Brentford, named Richard Baal, sold a quantity of the seed of the cauliflower, at that period bearing a very high price, to a number of persons carrying on the same trade in the vicinity of the metropolis, who, having sown it in the usual way, were surprised and alarmed on finding that, instead of cauliflowers, it produced a kind or variety of cabbage then in common use, and known as the long-leaved, probably resembling some of the cole-worts or kales of the present day. Enraged at their loss, and attributing it to dishonesty on the part of Baal, they joined in a prosecution against him. The trial took place in Westminster Hall, where he was adjudged to be guilty of fraud, and sentenced not only to pay back the price of the seed, but to compensate the gardeners for their loss in cultivation, and the diminished value of their expected crop. Thus was poor Baal ruined both in fortune and character by the ignorance of his judges, who, had they been acquainted with the true state of the case, would in all probability have acquitted him of all fraudulent intention, attributing the mishap to the accidental impregnation of the pistils of the cauliflower by the pollen of the colewort, through the medium of insects, or wafted by the wind.

To attempt a detail of the advances made in horticulture and agriculture, particularly in the former, since the time of Baal, solely in consequence of our knowledge of a fact that, unknown, caused his ruin, would be an all but interminable task. The natural varieties of esculent and ornamental plants were then comparatively few: those artificially obtained since are now approaching to a number, the extent of which it is impossible to foresee or calculate: their name is already "Legion." The most astonishing examples are to be found in the annals of the florists, the cultivator of geraniums, roses, heaths, and pansies. The art which has successively produced their hundreds and their thousands, differing only in the form or arrangement of a petal or the disposal of its tints, a spot or line, may perhaps be regarded with contempt by those whose pursuits are directed to an end more immediately and obviously useful; but, without seeking to oppose their prejudices by tracing the necessary association between the elegant and the useful in elevating man in the scale of being, let me remind such persons that the plastic power of nature is equally efficient in enlarging a root and seed as it is in varying the colours of a flower, and that the same means differently directed will effect both. How else the vast diversity of our home-grown fruits, almost equaling in many kinds, and in some surpassing those of our garden-flowers? The varieties of the apple alone—the most valuable of them all—amount to about two thousand; yet all of them are derived from two original species, viz. the *malus acerba*, the harsh and sour crab-tree of our forests, and the *malus mitis*, or sweet apple of a milder climate; both of which are by some botanists considered to be natural varieties of the same, though their origin cannot now be traced. These two thousand varieties, about one thousand kinds of pear, and half of the latter number of cherries and plums individually, have all originated from seed, and are indebted for their peculiarities in flavour, hue, and form or size, to the pollen with which that seed was fecundated. That which has been effected in regard to fruit and flowers is equally possible with roots and grain, as well as other vegetable products requiring cultivation on a large scale. If by crossing the breed in cattle the agility and muscular forces of the horse have been improved, adapting him to the various purposes for which his powers are required, the flesh of the ox and sheep rendered more palatable and nutritious, and the wool of the latter increased in fineness and quantity, the attributes of the plant may be called forth and rendered more subservient to the wealth of the agriculturist by similar means. The plant and the animal are both organic structures, subject to the same general laws of development and reproduction, of improvement and deterioration; and in permitting the manifestation of those laws, though only to the slight extent of our present knowledge, nature has bestowed on man a power of forestalling, for his own immediate purposes, changes that, under her own dominion, would perhaps never take place, or but after the lapse of thousands of years.

We might pursue this subject much further, but it would carry us beyond the ordinary limits of a lecture: and as my purpose in this, the introductory one of a course of some extent, is rather to call your attention to the science of botany as one of practical utility, than as a mere source of amusement, if that purpose has been attained it will be sufficient for the present. In our next, some detail of the functions and organs by which vegetable life is maintained will be necessary to the understanding of those that will follow. The cultivator of plants who knows nothing of their anatomy and physiology is much in the same position as the quack who undertakes to lop off a man's limb without knowing the veins and arteries he must sever in the operation, or who prescribes a course of diet or medicine, ignorant alike of the nature of either, and of the vital energies through which he expects them to prevail.

THOUGHTS ON THE RELATIVE INTERESTS OF THE AGRICULTURAL CLASSES OF GREAT BRITAIN, WITH REFERENCE TO THE SEVERAL DUTIES OF LANDLORDS AND FARMERS TOWARD THEIR LABOURERS.

SUGGESTED BY THE REPORT OF SPEECHES OF NOBLEMEN AND GENTLEMEN, DELIVERED AT AGRICULTURAL MEETINGS; BY THE RESOLUTIONS PASSED AT SOME OF THOSE MEETINGS, TO MAKE THE COMFORT OF THE LABOURER A SUBJECT OF ESPECIAL INQUIRY; AND PARTICULARLY AT THE GENERAL MEETINGS OF THE ROYAL AGRICULTURAL SOCIETY OF ENGLAND, AT OXFORD AND CAMBRIDGE.

"Take care of the industrious labourers."

[We insert this article from a desire of calling attention to the subject, but must not be considered as entirely concurring in the opinions of the writer.—ED. F. MAG.]

"Let everything be done in order" is a precept which we acknowledge as Christians, and which is equally applicable to us as agriculturists.

In setting forth the claims of the labouring classes upon the farmers and others engaged in agricultural pursuits, it is by no means intended to interfere with the present order of things in respect to the demand and supply of labour: it is not intended to raise the working class out of their place, to put them into that immediately above it, but to maintain them in their own—to remind the higher class, on the one hand, of the duties required of them to those next below them; and on the other of the obligation which every Christian acknowledges to be due to those above him—"All power is of God: the powers that be are ordained of God."*

Let the duties of farmers to labourers be first considered; and, secondly, those of landlords to farmers.

First, as to the duties of farmers to labourers.—It will be obvious that a mutual dependance of the one on the other must be sought, and a reciprocity established, in order to effect the desired object. That the farmer cannot carry on his business without labourers will be readily admitted; and that the labourer cannot sustain himself and family without employment is equally clear. The question, then, to be resolved is simply this—How far is the farmer bound to pay the labourer, in order to acquit himself with justice and fairness, by giving an adequate return for the commodity received?

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* Romans xiii. 1.

The answer to this question will doubtless vary, according to the means of sustaining a family in situations greatly dissimilar; the same sum will not procure in all places the same quantity or quality of sustenance, but in all places it ought to be considered that "the labourer is worthy of his hire;"* and that to pay him in a way that precludes him from the possibility of obtaining a sufficiency for the support of himself and family, must be considered an injustice toward him; and the party so offending exposes himself to the reproach of the apostle: "Behold the hire of the labourers who have reaped down your fields, which is of you kept back by fraud, crieth—" &c., &c.†

Let us then examine what is a fair remuneration for labour bestowed, so that the charge of fraud may be avoided, and that no excessive or undue payment for labour be required of the farmer; for it is certainly not intended to exact an unreasonable price in return for the commodity received, but a fair and equal exchange.

It is not to be required of the farmer to pay such a price for labour as would tend to exalt the labourer above his position in society; for there is no law, human or divine, that requires such terms from the employer. The highest authority recognized among Christian men has declared—"The poor shall never cease out of the land."‡ And again—"Ye have the poor always with you."§ These are sufficient to shew that it is among the eternal purposes of a God of order, that a class for labour shall ever remain to cultivate the earth.

The same authority, however, requireth from the employer the means to enable the employed to support themselves and their families by the labour of their hands.

That such wages are paid in many instances by tradesmen and manufacturers, as are far above the necessary requirement for provisions, must be allowed by most; and where the demand for labour of a peculiar character is above the supply, it must necessarily be so: but such instances being occasioned by temporary excitement, and not by a constant demand, they frequently produce great fluctuation in the amount of wages; the price of provisions having far less influence in regulating the price of labour in such instances, than in agriculture; for the manufacturing and trading classes, though paid high wages at times, are often found (when the demand for their particular work is slack) enduring privations which reduce them to a most deplorable state of misery. This does not, however, apply with equal force to agriculture; for there, the call for labour being nearly the same at all times, the demand and supply are much more nearly balanced; and the price of provisions, consequently, has the greatest influence in regulating the price of labour.

The amount of wages, nevertheless, varies even in agriculture, according to varying localities, in the several counties of England, and also in districts within the same counties. In some places two shillings per day, for day work, is considered sufficient, while in others less than this sum is thought to be adequate pay, and in a third place two shillings and sixpence is not thought too much; but it must depend in great measure, in each case, on the extra means allowed to the labourer where the nominal wages are low, which means are unnecessary or unattainable where the pay is of the highest class; so that it is probable the two extremes approach more nearly to an equality than at first sight appears. Of course the whole must be compared with the price of provisions, as a sufficiency of that commodity must be allowed to a family to support them, without recourse being had to adventitious aid, and without assistance being sought from funds set apart by law for the aged, the sick, and the infirm.

The amount of day-wages, then, forming the basis of the present calculation, it will naturally be asked, what proportion ought they to bear to the value of provisions? and as *flour* may be allowed to stand as the representative of all other kinds, what proportion ought day-wages to bear to that article?

Let it be supposed that a family consists of five individuals, viz., man, wife, and three children. What will be the demand of these five upon the article of provisions, considered as a fair equivalent for that which the labourer has to supply?

Supposing, again, that flour amounts to half the necessary requirement of a family, and day wages are to be taken at two shillings per day, there will then be six shillings weekly to be expended in flour; which, at forty-eight shillings per sack for that of second quality, will allow one-eighth part of a sack weekly (or five gallons), being one gallon per week for each individual, which is about the quantity required.

Day-wages, therefore, may be considered as fairly rated, if they amount to a twenty-fourth part of the price of a sack of such flour. It is to be observed that the above scale is proposed merely as a groundwork upon which individual calculations may be founded, according to circumstances of time and place, and not to be by any means limited to its literal terms.

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* Luke x. 7.

† James v. 4.

‡ Deut. xi. 14.

§ Matt. xxii. 11.

In cases of larger families, the employer will doubtless give to the labourer an opportunity of acquiring larger funds by giving him piece-work; which, by inducing greater exertion, will enable him to obtain a shilling per day over the amount of day-wages; or in case of the elder children of such family being grown up to a working state, he will call one or two, as the case may be, into service, whereby an addition may be made to the general fund. In many places there is much occupation for females, as where hops and fruit plantations prevail, where women are chiefly employed to gather in the crop—all of which contributes to the same; and frequently the amount of one or two rents is collected from these little additions. But it is by no means intended to infer that because a labourer under such circumstances is to be allowed such privileges, therefore another, having less claim on the score of family, is to be abridged, or a single man to be depressed below the level of his fellows; for, in that case, how is he, the single man, to provide the means of a settlement? which ought to be considered the ultimate object of every individual. Besides, he ought, during this spring-time of life, to have the opportunity afforded him of providing for the expenses of furnishing a house, and preparing for a family, or such as may be occasioned by sickness, which can be secured to him by joining a friendly society (where founded on safe principles), such as are already in operation in many places, where pay in sickness or old age, sufficient to secure greater comforts than can be obtained in an union house, may be procured, and is within the reach of every one, by very small contributions, if entered upon when young; and where the expenses of funerals may also be had in the same way, with various other benefits either single or combined, and which ought to be urged upon every young man and young woman, by those who can either influence or assist them.

The bodily power of a labourer, and skill in his occupation, are his marketable commodities. If one man, therefore, is entitled to a certain amount of wages in exchange for his disposable article, another, who supplies the same quantity and quality of labour, is justly entitled to the same remuneration, whether as the head of a family or a single man; and if that is withheld from him, he is defrauded of his rights, and his property is unjustly taken away and given to another.

The social affections of the labourer ought to be encouraged by every possible means, and usefulness in society in a moral sense should be cultivated, and *not the pecuniary use alone which is to be made of him*; so that, instead of considering the labourer as a mere implement of agriculture, whereby a profit is to be rung out of his sinews for the use of his employer, he ought to be informed of his responsibility as a rational and accountable creature, and thus raised in the scale of civilization, that he may be interested as well as engaged in the welfare of his country.

It cannot be expected, however, that such results should be obtained from those who pursue the profession of agriculture solely with a view to great profits; who, as capitalists, monopolize a number of farms, for the single purpose of accumulating the profits of each into a mass; and which profits are chiefly obtained by placing servants, at about fifty pounds a year, in an establishment, to the exclusion of respectable families. It cannot be expected, where five or six farms are brought into the occupation of a single individual, that the comforts, or even the just recompense of his endeavours, is given to the poor labourer. It is rather to be feared, where such a system prevails, that the labouring class are not only left without the consolation of having their griefs attended to, and their feelings soothed, by application to the comfortable farmhouse in times of sickness or of sorrow, and by sympathies of its kind master or mistress supplied to them in their distress, but the homestead itself is either occupied as above, shut up, or converted into tenements for the occupation of other labourers; wrenching asunder, as it were, the connecting link of agricultural society, destroying the middle class, and depriving the poor families of one of their greatest dependencies, at the same time withholding the opportunity which might present itself to a young farmer, of establishing himself and a rising family in independence, and giving him an opportunity of fulfilling those duties to the labouring class, which, if not entirely neglected, are frequently but slightly observed by the opulent capitalist.

If the evils of a too extensive occupation thus fails in producing for the labourer the care desired, neither is it to be expected in the opposite scale. An occupation upon too small an extent does not allow sufficient stimulus to produce it: the capital, also, is too diminutive to call forth the energies of a young and well-informed mind: neither can the person occupying a minute portion of land have sufficient leisure for studying the experience of others; his energies are too cramped, as well as his opportunities too scanty, for acquiring the knowledge which others could impart; the care of making both ends meet will press upon his mind too much, and will force upon him a neglect of those means of replenishing his land, which are necessary for the purpose of farming to advantage; his thoughts will naturally turn to the inquiry of *how few* labourers he can do with, instead of *how many* could be employed with profit?

It will not be required to fix upon any given number of acres as that best adapted to carry out the principle contended for, because the great variety of soils, from their difference of value and produce, will preclude a definite quantity from being fixed on; but it may not be unreasonable to say that an occupation, with its necessary capital, which may yield a profit of four or five hundred pounds a year, would answer the end proposed.

It would be a vain attempt to limit the occupation of land to any exact extent; it might be double that above proposed, without producing the evils apprehended, but it cannot be allowed to extend to five times that amount without injury to the principle laid down, and partaking of that monopolizing spirit before deprecated; nor may it be reduced down to a fifth of the same, for reasons already stated.

Suppose a farm of any given extent, having a tenant at a rent of £500 a year, it will not appear unreasonable to calculate a living profit thereon equal in amount to the rent; which would give a respectable character to the occupier, and enable him to consider the comforts of his labourers.

Suppose, again, five such farms in the occupation of a person resident in a town at some miles distant, and having a bailiff in the management of each farm, at wages amounting to £50 a year, which would give a profit to the capitalist of £450 upon each farm, or £2,250 year altogether; such cases are to be found, and probably 10 per cent. obtained for the capital thus employed, when under ordinary circumstances much less would be produced. It is still in the power of every capitalist to employ his money in such a speculation if he pleases, but the object of these remarks is to shew the labourer is not benefited.

It may be said that *system* would prevent the evils apprehended in the foregoing view, that it would apply equally to large or small occupations; but it ought not to be forgotten that good system does not necessarily accompany large capital, nor should it be supposed that the capitalist takes invariably into his calculation the "care of the labourer;" it is rather to be feared that the whole of system, in its general bearing, begins and ends with profit and loss.

System may undoubtedly produce as much for the public as if the same extent of land were under the hands of five resident individuals, but the comforts supplied to the labouring families in the first instance would be completely thrown into the shade by a comparison with the latter. The poor families will receive from the five far greater benefits than can be had where only bailiffs or managers are kept.

System, therefore, though invaluable in its place and essential to good management, being engrossed too much with pecuniary matters, enters but little into the care of the labourer, and fails of course in one material point. Farms, therefore, extending from three to six hundred acres, according to the quality of the land, with resident occupiers, may be proposed as providing the largest share of care for the labourer, and respectability to the character of the farmer, without any loss to the public.

It is not attempted to show what would be the effect of the proposed view, if acted upon; but it may be fairly presumed that the benefit to the labouring classes would be sufficiently important to raise in their minds a grateful sense of their obligations, and create a bond of affection towards their employers, highly desirable. The labouring class ought also to be encouraged to avail themselves of the opportunities which public institutions for instruction now offer in almost every parish, and should not be left without inducement to become acquainted with such things as the ability to read would supply; and there can be little doubt that if the poorer classes are treated as fellow creatures—who are liable alike to the infirmities of our common nature, of equal value in the sight of God, redeemed by the same Saviour, and heirs alike to a heavenly inheritance, a great moral change would be achieved in their character.

For surely, if the mind of the labourer be duly impressed with the leading truths of the gospel; if he be satisfied that the divine government of the world is conducted upon the principles of infinite wisdom, that the lot of every creature is under such supervision "that a sparrow cannot fall without permission, and that the hairs of the head are numbered;" * if he be farther convinced, that in this land of gospel light, his own case, though apparently low, is in truth, far more desirable than to be *chief* of those where darkness reigns, he may be induced to conclude in the words of the Psalmist, "The lines are fallen unto me in pleasant places, yea, I have a goodly heritage.†

When the mind is emancipated from ignorance and prejudice, a greater degree of independence will be manifested; not that spurious independence which produces a desire to divest itself of all obligation, but that *true* independence which is able to appreciate the moral qualities of men, without being influenced by sordid views.

That the labouring class can ever be independent of *all* influence, is neither expected nor desired; they must always be subject to that restraint which is consequent upon their station in society, and which is by no means incompatible with true liberty.

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* Matt. x., 29, 30.

† Ps. xii., 6.

To loosen the ties of kindness, and to weaken a proper sense of favour conferred, would be to them a great injury; their being without means to help themselves in accidental circumstances, and the law of parochial settlement will generally present a sufficient check to a presumptuous independence.

The second point to be considered—"The duties of landlords," must be touched on with that caution and care that are most becoming to use, yet without shrinking from the responsibility and liberty which truth requires; the desire expressed at first not to interfere with the present state of things must be repeated, while the suggestions thrown out, are most respectfully submitted for consideration.

If the foregoing view of duties between farmers and labourers be a correct one, and such as can be sympathized in by landlords, it will produce a corresponding result. Landlords will shew a greater desire to have for tenants *such* as reside on their farms, and engage personally in its busines, rather than those who are ready to grasp every farm in the spirit of monopoly, and fill the place themselves ought to occupy with strangers who are indifferent to the comforts of the labourer, unable to administer to their necessities, or whose propensities may become a snare to lead them astray.

The inquiry of landlords will not be confined to the character of their farmers in reference to their knowledge of business or amount of capital (these are requisites they are supposed to possess), but also to their qualifications for fulfilling the duties before enumerated. Should candidates, therefore, appear for vacant farms, or those likely to become so, landlords will consider that "care for the labourer" should supersede the desire for the highest rent. They will soon find that the principle by which they are actuated will diffuse itself throughout the length and breadth over which their influence extends; and thus bring about, without occasion to coerce any one, a state of things which will commend itself to the consciences of mankind.

True patriotism must receive its nutriment from true religion, and true honour can only be acquired by giving honour to him who is the fountain of it! "Them that honour *me*, I will honour; and they that despise me shall be lightly esteemed."*

Thus may landlords perform an important service to their country, by fostering a race of true patriots, who will help to preserve it from visitations of evil! If ten righteous persons would have saved Sodom and Gomorrah, shall we hesitate to say that the christian principle found in our land will be its surest safeguard! and those who strive most for the enlargement of that principle will be its truest preservers!!

Thus will the prophet's word be fulfilled:—"The liberal deviseth liberal things, and by liberal things shall he stand." Care will then be taken of the industrious labourer!!! AMICUS.

THE POTATO DISEASE.

SIR,—As the potato disease seems extending over every country, and as such various opinions exist as to the cause and remedy, and as no substitute can be found suitable to every soil and climate, equal in bulk and nutriment, to feed the millions who subsist chiefly on potatoes, and prevent the increase of consumption of wheat and oat flour and meal by other classes, I state the reason why I think it has been proved to be an atmospheric disease, and most probably will cease to exist; and that if it continue to affect the potatoes, we have good reason to suppose that by severing the tops as soon as the leaves are affected, the tubers then formed may be perfectly sound, and half an average crop obtained.

Potatoes grown under cover have not been affected with the disease; and where the tops were cut off or pulled up as soon as the disease attacked the leaves, the tubers have been found free from disease; and as the sound tubers taken from diseased roots last year kept well through the winter, we may presume the produce of the present crop will not rot.

Where potatoes were grown on sandy or gravelly soils this year, as soon as the tops were diseased, the sun scorched and withered them before the diseased sap had infected the tubers, and they were found to be perfectly sound.

Where potatoes were cleared off the ground before the disease appeared on the leaves, the tubers found, on digging the ground a week or two since, shew no signs of being affected: thus it appears evident that the disease is not caused by any defect in the tubers.

It has not been ascertained, I believe, whether the disease appears on both the late and early species at the same time, where growing on the same land, or whether it attacks the potatoes at a certain stage of their growth. I have reason to suppose that the disease does not appear until the potatoes are in bloom, or, as is the case with the early shaw, when the bloom-buds appear—first, because I have seen beds of early shaws affected when a later species, growing in adjoining beds, were not, but were attacked soon after; and next, because the early shaw potatoes planted as late as the first week in June have not been attacked with the disease till the first formed tubers were a full size for use, although not full grown; but as far as my experience goes, I believe the later species of potatoes (winter potatoes, as they are called here) have not been found to have tubers larger than walnuts when attacked with the disease; hence I am of opinion that the quick growing varieties are the best to grow whilst the disease continues to exist, if not always.

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* 1 Sam. ii., 30.

All the experiments proposed by Dr. Scot, at the London Botanical Society, have been tried, and the disease is proved *not to be contageous,* and that diseased tubers planted on land where a diseased crop had been grown will produce sound potatoes, if planted within a few days after being taken out of the ground in autumn; or if dried, or the diseased portion of the potatoes cut off, will keep and produce sound potatoes if planted in the spring.

The produce of the early shaw obtained on allotments and in gardens, where the tops had been cut off, I am informed, was about one bushel per rod, and no appearance of disease; where the tops were *not cut off,* more or less of the tubers were affected, but few were rotten. On the same lands there was double the produce last year, but from one-half to two-thirds were rotten, and it was grievous to see the heaps and rows left, not even fit to feed swine. The deficiency of produce this year was occasioned by the drought.

In your Nottinghamshire report, October 5th, the writer says that "we may consider the potatoes as being nearly worthless to us, and may soon be known only by name!" If your reporter had stated what kinds of potatoes were grown, and what weather had prevailed during the summer, it would probably have assisted in ascertaining what is the cause of the blight.

A Mr. Campbell, of Scotland (see *Mark Lane Express*), seems to think that the disease is caused from want of renewing the stock from its native place, Peru, and that symptoms of age has shown itself from 1834. Our crops were as good till the "murrain" attacked them last year, as they were 50 years ago: we have never suffered from the curl, or from the sets not vegetating. Mr. Campbell, too, advises the culture of no potatoes but what perfect their bloom and produce apples! we have been advised by scientific men to have the blooms picked off to increase the produce of potatoes. The "no-blows," viz., the early shaws and other large varieties of quick-growing potatoes, are extensively grown in the eastern counties; these just show their bloom, and then it falls off, and the portion intended for seed is looked over before raising the crop, and all plants remaining green in the stem or found to have produced apples are taken out and consumed.

Persons who grow potatoes only for their own use commonly prefer the early sorts: a few planted early in the spring serve for summer use, and what are required for the winter and seed may be planted on a turnip fallow; when the turnips are sown in May or June, the crop will be as large and will be fit to take up in September or October, and the later they are planted the longer they will keep without sprouting in the spring.

The coarser sorts may produce more, but the quick growers admit of storing soon enough to plant cabbages for spring use; and give time to consume them; thus are best adapted for garden and allotment culture, and I think must be the best to grow in Ireland and Scotland, and all late districts.

The growth of potatoes must not be given up or reduced whilst even half our *former* average crops are obtained. If, as has been estimated, 32 bushels of wheat, and a corresponding weight of barley and oats, is the average produce, and 320 bushels of potatoes, being in weight and measure 8 times as much, the question is how are the 7 millions who chiefly live on potatoes to be fed? and as potatoes are consumed by every family in the United Kingdom, amounting to 20 millions more, the consumption of "bread-stuffs" would be enormously increased. I am, Sir, your obedient servant,

CHAS. POPPY.

REPEAL OF THE MALT TAX.

TO THE RIGHT HON. THE LORD JOHN RUSSELL, M.P., FIRST LORD OF THE TREASURY, ETC.

MY LORD,—The failure of the potato crop, and the consequent approximation to a famine, have induced one who is little accustomed to writing about or mixing with public matters, to thus address your lordship. It is not a period for modest hesitation when the vessel of the state may be foundering. As a practical man, I venture to call your lordship's attention to facts only required to be known in order to be universally adopted.

My experience has proved to me that all grain wherewith cattle are fed ought to be malted, as all potatoes by which human beings are fed ought to boiled, baked, or roasted. The same principle holds good in all. By malting, the saccharine matter is evolved, and the substance eaten becomes easily digestible. Every grain is the same. Not only barley, but peas, beans, wheat, Indian corn, maize, &c., may have this principle applied to them. Hence, although learned philosophers may hold that malting creates no new property in the grain, it makes the material that would not otherwise be properly applied (obstructing the digestion, and diminishing the appetite) useful in fattening, cleansing, and bene fiting the animal that feeds upon it.

In the second place, of what vast use malted grain would be to mix with wheaten flour in making a cheap and wholesome loaf for human food! In America, Indian corn is very generally mixed with wheaten flour, and many years have tested its excellency. Why not adopt a similar process in unhappy Ireland, and the islands and highlands of Scotland, during the present dreadful destitution? Providence seems to have sent the blight into the potato root at this particular period, in order to force a better provision being made for the Irish, a wiser dependance than the uncertain potato. If so, we may truly say, with the poet,

> "Behind a frowning providence,
> He hides a smiling face."

In the third place, good and wholesome drink might be made from the malting of inferior grain; and the poor would be placed in a position of much greater comfort, and with a kinder regard to their employers than by any other mode that can be applied.

My wonder is, not that there is such an outcry now to repeal the malt tax, but that it was not repealed long since. If it net four millions to the revenue, it injures the country to the extent of at least forty millions; and bold must that Minister be, slavish must that Parliament be, who would refuse, under the trying and crying circumstances of the country, to repeal the malt tax.

I have the honour to be, my lord,
Your obedient servant,
A. Parker.

42, *Keppel-street, Russell-square.*

RICHMOND FARMERS' CLUB.

The monthly meeting of the Richmondshire Farmers' Club was held at the King's Head Inn on Thursday, the 1st of October, at six o'clock in the evening. The meeting was attended by several landlords, land-agents, and farmers from the surrounding district.

The subject for the evening's discussion was, "The best mode of Letting Farms, with a view to the permanent improvement of the land, due regard being had to the just rights of both landlord and tenant."

Mr. Wharton, of Skelton Castle, introduced the subject in a very clear and straightforward manner, and was listened to with the greatest attention. In the course of his address he said that his chief reason for suggesting this subject for discussion was, the interest it had created among agriculturists generally, as shown by the attention given to it by other farmers' clubs, especially the parent one in London. The present system of letting farms from year to year, as practised in this neighbourhood, is bad—radically bad. It is most objectionable for many reasons, but particularly on the ground of its preventing the tenant from expending money on improvements, as he has no security that he will reap the advantages they are intended to procure, and consequently has no interest in them. The moment these improvements are made, they are the property of the landlord; and the tenant might be deprived of his farm at the very next term. Under these circumstances it were unreasonable to expect extraordinary improvements from the tenants; and the landlords, as a body, were not in a condition to do much, for this reason—no class have so little ready money at command as landlords. He did not make this assertion lightly; but, from his former connection with a public office, it was known to him that there was scarcely an instance of a large landed proprietor who did not die insolvent in his personal estate Hence the necessity for giving security and encouragement to tenants of capital to invest their money. It is capable of proof also that tenant-farmers can devise means to make improvements more economically than landlords. The latter have to procure everything necessary at the greatest cost, and often perform the work at unsuitable seasons, while the former go quietly about the business, and, by the exercise of skill and care, and, by doing the teamwork at vacant times, contrive materially to reduce the expense. Landlords, when they lay out money for tenants, expect a per centage on the outlay; and gentlemen will admit that the tenant-farmer should be remunerated for money expended by him in improvements. There are, however, improvable qualities in the land which are as much the landlord's as the tenant's. To remedy the evils arising out of the present system of letting farms, two modes have been suggested and successfully practised in different countries: first, the plan of letting farms for a long term, as adopted in Scotland; and, secondly, the system followed in Lincolnshire, of repaying the tenant, on his leaving the farm, for the unexhausted improvements he had made upon it. The objections to leases are many. It is more difficult to get a suitable tenant for a farm let on lease, than it is when the farm is let under the Lincolnshire system; because the former requires a man of superior judgment and large capital, as his improvements must be made early in his lease in order to ensure a full return; while the latter allows the tenant to proceed with his improvements according to his means, without binding him to any particular time. Under a lease, too, it is difficult to prevent a bad tenant from injuring the land. If he does so, the landlord has no redress; he may go away after some years, or, if he stay the full term, the farm is completely run out. Again, when a tenant has a lease, and is uncertain about getting a renewal of it, the temptations to take advantage towards the termination are very great. It would be well in leases of twenty-one years to have a covenant for renewal before the expiry of the term, thus holding out an inducement to the tenant to farm well; for, although a higher rent might, in some cases, be exacted in consequence, the farm, from its superior condition, would in all probability be anything but a dear one. Another great objection to a lease is that it may be agreed upon when corn is at a certain rate, and the rent calculated accordingly. A change may take place, corn settles in price, and the tenant is liable to suffer loss during the remainder of his term. These objections seem to be avoided under the system of yearly tenancies with covenants for repayment for extraordinary improvements unexhausted on the farm, such as draining, stubbing old fences, and artificial manures, which ought to be paid for according to a scale previously agreed upon. In some parts of Lincolnshire it is customary to allow the tenant a certain number of years to repay him for his improvements. Thus, when he is about to drain, he gives notice to the landlord or his agent that he is going to lay out a certain sum in draining, on a particular part of the farm. The work is regularly inspected; and, on its being satisfactorily completed, from seven to fourteen years is allowed as compensation for the outlay. If the tenant leave after only five years have elapsed, he is entitled to claim two-sevenths or nine-fourteenths of this outlay from the landlord or incoming tenant. These claims are generally taken up by the incoming tenant. Other allowances are agreed upon in like manner, thus:—For lime, four years is allowed; for marl, six or seven years; for buildings, when made entirely by tenant, twenty or twenty-one years; for bones and artificial manures the custom varies; but for the former two or three years. It is admitted that where stock have been fed on oil cake, the manure they make is of superior quality; and the advantage to the land from its use remains for some years; hence an allowance is made of one-third of the cost of the cake for the first year, and one-sixth for the second year. He was inclined to lean to the Lincolnshire system; it is more easily engrafted on the plan now pursued in this district; and with a poor tenant, the landlord is in no worse situation under it, than he would be if the present custom was continued. In some places there is a clause introduced into the agreement to protect landlord from dilapidations, which seems equitable, and in some cases may be absolutely necessary. It might happen that while a tenant made a great claim for compensation on some of the grounds already mentioned, he was himself liable for considerable sums for dilapidations. He had been most anxious to hear this subject discussed rather than to have introduced it; but, being urged to do so, had consented, and now hoped to hear some valuable remarks from men of greater experience, before he left the room.

A very interesting discussion followed Mr. Wharton's address, in which Mr. Jaques, Mr. Hartley, Mr. Outhwaite, Rev. W. Wharton, and the secretary took part.

The evils arising from the present system of letting from year to year without compensating covenants were unanimously admitted. The advantages resulting from the plan pursued in Lincolnshire were supported by parties who had seen their good effects to both landlord and tenant. The system of letting on lease as followed in Scotland was fully gone into by several of the members who had visited that country, and by one of them who had resided there for several years; the advantages of the system shown by a well-cultivated country and a thriving tenantry; several objections considered and remedies suggested; the application of corn rents to arable farms recommended, and various other matters affecting the question.

At the termination of the discussion the following decision was unanimously resolved upon—

"That permanent improvement to the land can only be attained by security for outlay, and that this security is to be procured either by lease (as proved by the results of experience in Scotland), or by a system of repayment for unexhausted improvements, as is the case in Lincolnshire."

METEOROLOGICAL DIARY.

BAROMETER.			THERMOMETER.			WIND AND STATE.		ATMOSPHERE.		
Day.	8 a.m.	10p.m.	Min.	Max.	10p.m.	Direction.	Force.	8 a. m.	2 p. m.	10 p. m.
	in. cts.	in. cts.								
Sept. 19	29.71	29.71	52	67	52	S.E. to N.E.	lively	fine	sun	fine
20	29.54	29.62	51	67	57	S.E. to N.E.	strong	fine	sun	fine
21	29.62	29.63	54	65	54	Easterly	brisk	cloudy	cloudy	fine
22	29.55	29.50	56	67	55	East	lively	cloudy	cloudy	fine
23	29.45	29.45	57	66	54	East	lively	cloudy	fine	cloudy
24	29.53	29.64	53	63	55	S. W. [by N.	gentle	cloudy	sun	cloudy
25	29.76	29.82	49	66	52	W. by S., W.	gentle	cloudy	cloudy	fine
26	29.80	29.70	50	65	56	W. by North	lively	cloudy	cloudy	cloudy
27	29.76	29.75	51	66	49	W. by South	gentle	fine	sun	cloudy
28	29.64	29.55	49	63	43	W. by South	gentle	cloudy	cloudy	fine
29	29.49	29.49	38	60	42	W. by North	gentle	fine	sun	fine
30	29.62	29.85	37	63	47	N. West	gentle	fine	sun	fine
Oct. 1	29.93	29.94	42	64	55	W., N. W.	gentle	cloudy	sun	cloudy
2	29.86	29.70	53	64	56	W. by S., W.	gentle	cloudy	cloudy	cloudy
3	29.70	29.80	55	61	41	N. West	gentle	fine	sun	fine
4	29.77	29.56	37	63	56	S. East	variable	cloudy	sun	cloudy
5	29.45	29.38	54	65	55	S. West	lively	cloudy	sun	cloudy
6	29.42	29.56	52	61	50	S.W., S.	variable	cloudy	cloudy	cloudy
7	29.52	29.40	48	61	54	S. West	strong	cloudy	cloudy	cloudy
8	29.44	29.64	46	58	44	S.W. West^y	gusty	fine	cloudy	fine
9	29.69	29.52	43	57	55	S. West	brisk	cloudy	cloudy	cloudy
10	29.46	29.80	49	62	50	S. West	brisk	cloudy	cloudy	fine
11	29.79	29.55	44	63	50	S.E., S.	lively	cloudy	cloudy	cloudy
12	29.50	29.60	41	59	49	N. West	variable	fine	sun	cloudy
13	29.86	29.90	41	53	39	North	brisk	fine	sun	fine
14	29.55	29.05	35	54	46	N. to S.W.	calm	cloudy	cloudy	fine
15	29.00	29.10	41	56	44	S. West	gentle	cloudy	cloudy	cloudy
16	29.17	29.28	44	63	45	S. by E.	gentle	fine	sun	fine
17	29.25	29.57	44	57	47	S. East	gentle	cloudy	sun	fine
18	29.55	29.68	40	53	41	West	gentle	cloudy	cloudy	cloudy
19	29.55	29.68	37	61	48	W.byN., S.W.	gentle	fine	sun	fine
20	29.55	29.59	41	57	41	Westerly	gentle	fine	sun	fine

ESTIMATED AVERAGES FOR OCTOBER.

Barometer.		Thermometer.		
High.	Low.	High.	Low.	Mean.
30.610	28.740	68	27	49

REAL AVERAGE TEMPERATURE OF THE PERIOD.

Lowest.	Highest.	Mean.
46.4	61.56	53.80

WEATHER AND PHENOMENA.

Sept. 19, hazy, clearing off. 20, fine, very strong eastern current. 21, first rain for a long period. 22, 23, equinox, marked by a change of wind, with rain early on 23rd. 24, rainy night after lightning. 25, finer day, a shower. 26, overcast. 27, the same, without rain, beautiful evening, and singular cirro-stratus clouds. 28, copious rain in the night, changeable. 29, strong dews, fine sunny day. 30, the same, quite beautiful.

LUNATIONS.—New moon, 20th day, 3h. 34m. afternoon. First quarter, 28th, 7h. 26m. morning.

October 1, another beautiful day, changeable at night. 2, small rain, occasional brisk showers. 3, fine, after a windy night. 4, some fine gleams, changeable with wind again. 5, sharp showers. 6, profusely wet. 7, gusts of wind, brisk showers. 8, rain, gusty wind, some sun. 9, almost entirely wet. 10, showers, fine evening. 11, much rain. 12, fine till noon, small rain late in the day. 13, brisk wind till evening, but fine. 14, extremely wet most of the day. 15, rainy morning, finer afternoon, 16, a fine cheerful day. 17, a small shower, otherwise fine. 18, much rain, fine night. 19, one shower, fine pleasant day, evening changeable. 20, fine in general. Fifteen days of the twenty with more or less rain.

LUNATIONS.—Full moon, 4th day, 10h. 6m. afternoon. Last quarter, 12th, 4h. 8m. morning. New moon, 20th, 7h. 44m. morning.

REMARKS REFERRING TO AGRICULTURE.

So much wet has fallen that the ploughing is rather retarded; still, the work proceeds in open soils, and some wheat is sown. Till the great glut of rain, the subsoil was quite dry, and almost impenetrable. Potatoes vary much in quality; the crop is short, but the tubers rise better than was expected.

JOHN TOWERS.

Maidenhead Thicket.

CALENDAR OF HORTICULTURE.—NOVEMBER.

RETROSPECT.

The easterly winds, generally several points toward or from the north, gave way at the autumnal equinox, veering to direct east, thence east by south, to south and south-west. Aridity had increased to that period; and on the 23rd of September, when rain commenced, it was almost impossible to penetrate loamy ground at the depth of an ordinary spade. Then followed four days more or less rainy: but the month closed beautifully. The 1st and 3rd of October were likewise fine; otherwise, to the 15th, the weather was very wet, to an extent indeed which promised to balance "the average," deranged by the drought of the summer.

The garden crops had improved in a degree corresponding with the warmth of the ground, aided by abundance of moisture and a very genial state of atmospheric temperature. So persisting was the rain, that it was found difficult to touch the land even by fits and snatches, and therefore some opportunities for removal and planting have been lost, and weeds prevailed. We never saw winter spinach, broccoli, and cabbage so very fine and luxuriant at the like time of year. As to potatoes, the state of the haulm has proved no unerring criterion, and, judging from much evidence, we think it highly probable that the crop will be far better than the tocsin of alarm has permitted the public to expect.

Autumnal planting has been extensively attempted: we ourselves have put in all the winter-store crops, six inches deep, with a little more earth raised as a rounded ridge over the course of each row. Over the sets, or (smaller) whole tubers, was sprinkled sawdust, mixed with one-fourth of fine coal-ashes and a little coal-soot. This application is wholly experimental, but it comprises the entire manure employed, and the ground is new.

OPERATIONS IN THE VEGETABLE GARDEN.

Potatoes will be already up most likely, unless a wet condition of the land have prohibited the digging. It is doubtful whether we ought to leave a portion in the ground all the winter; not that *frost* would hurt the tubers, were a small covering of fern or fog-grass, raked from pasture or orchard, and such like, laid over the rows, but because some persons, without any store, might be prevented from digging by the state of the ground.

Carrots, parsnip, beet, ought to be digged, and kept in dryish sand in some place where they would not freeze. A sufficient supply of *celery* also, and *celeriac* ought to be stored.

Every frame or pit out of use ought to be employed for lettuces, radish, cauliflowers, and salading. Such vegetables may be quite hardy so as to live on; but nothing can grow or be of any use during hard frost.

Asparagus.—Dress the beds and the double or single row plots thus, and speedily as weather will permit:—First, select any very fine plant for seed, and then cut quite back with a sharp, hooked knife all the haulm, and place it on some vacant spot to be burned. Then rake off all the weeds, and also an inch of the surface, the latter into the alleys; and sprinkle over the whole breadth so much common salt as will mark the ground like a very slight covering of snow. Finally, rake to a good surface, and cut even, by line, the edge at every extremity of the bed, for the sake of neatness.

This treatment differs much from that of the old gardeners', but it is founded on the following reasons:—The asparagus is perfectly hardy, and will rather benefit than otherwise by feeling the frost. No manure is wanted during the season of winter torpor, and therefore we defer its application till spring. Weeds are the bane of asparagus plots, but salt tends to prevent their propagation, and is also favourable to the plant.

Asparagus for forcing, over warm beds, is now set at work to furnish a second supply.

Artichoke beds.—Remove every dead leaf and stalk; strain a line on one or both sides of the row or rows, but so distant as not to permit the roots to be cut by the spade in digging out a trench, as for celery; the earth from which is to be neatly laid around the plants, so as to effectually mound them up: some use dry ashes. Fill the trench with leaves swept up from lawns or elsewhere, and scatter a little sand over them; they will gradually moulder away, and prepare either good vegetable earth as dress or leaf soil for potting, and in the spring may be removed to the compost ground.

Sea-kale is perfectly hardy; some should be covered with pots, after taking away the decayed leaves, to be forced by warm dung. The surface of the beds ought to be cleaned and made neat. This is generally a littering, untidy vegetable, and ought to be grown in some "slip," or external garden.

Rhubarb, of the fine, early kinds, should be mulched over the whole extent of the roots; the buds will soon appear, and then are to be covered with large pots or boxes. The giant varieties are always late, and the beds now require raking only.

Winter Spinach should be hand-weeded, and thinned to two or three inches.

Cauliflower for spring—protect, but give air to. Seedling may have a frame and lights; to be matted over in severe weather.

Keep the plants of all the cabbage family free from weeds. And in using Brussels sprouts do not take off the tops till after winter, but break off the young stem-plants in thinning order.

Dig and trench vacant places, and raise ridges. Sow at the end of the month some early peas and broad beans; but little is gained by such attempts.

FRUIT DEPARTMENT.

All the spur-bearing trees may be safely pruned back to fruitful buds. They should then be tied, or nailed, according to their situations, on espaliers, or against walls.

The *Peach* and *Nectarine* we would not touch: in large establishments, indeed, every favourable opportunity must be embraced; but in a small, compact garden it will be better to defer the regulation till the buds swell.

Vines, however, should be speedily regulated, and the bearing-wood laid in judiciously; if the long-rod annual system be observed, the retained leaders may be four feet apart; provision being made for the supply of a succession between every two of those.

Fig-trees cover effectually, and *more particularly this year,* because the fruit is profuse and large, in consequence of the late hot summer.

FORCING FRUIT-HOUSES.

Keep the *fruiter pines* cool and dry; the successions and nurse-plants always warm and progressing. Gardeners will do well to keep in mind the system of retaining suckers on the old plants, and conjointly that of growing in beds without pots. Both are now strongly urged.

Cucumbers in large pots, grown in a warm stove, can be made to supply a family from this time till July.

Kidney beans now sown in small pots, and placed on a shelf of a bark-stove, or tank-house, will soon be fit for shifting.

ORNAMENTAL GROUNDS.

Clear all the parterres and borders from dead annuals, weeds, useless off-sets, &c.; if the temperament of the ground permit, rake it. Strew fresh heath soil, or leaf mould, and sand, blended with a portion of light, free loam, over the surface of American beds.

Plant *Tulips* and other *bulbs* in beds of generous loam; the larger sort three inches deep, closely in contact with the soil at bottom and round the bulbs; then fill the holes with sand. Plunge potted *Hyacinths* deep in sand-beds or borders. Protect in cool, airy frames *Auriculas* and *Carnations. Roses* in pots are to be pruned prior to being taken to the flower-house or rose-pit.

Sweep and roll lawns and gravel walks; remove littering leaves to the compost-ground to make leaf soil; prune flowering shrubs, and make the shrubberies neat; but the leaves which fall on the ground there can be advantageously left as dress, to be digged in after winter.

The Greenhouse will require plenty of air and little water, for now is the season of torpidity. The flower-house and stove should not be suffered to become too cold; 55 deg. will secure most plants, and growth is not desirable.

An important and difficult operation is the preservation of a ripe, late crop of grapes, and such is the black West's St. Peter's. Mouldiness is, unfortunately, a disease of this year, and grapes are soon its victims. A damp house is a provocative, dryness the sole preserver; for heat is not wanted, and cold, under that of frost, is no enemy.

Air then, in clear, dry weather is essential; and a hot flue as a concomitant from 8 A.M. to noon (but only when air can be given) is required to dry the house. So long as damp fog and rain require the lights to be quite close, fire is at best but a questionable agent, because it raises vapour. All moulding berries must be timely cut off, and with great care.

PLANTING.

Writers are very liberal in their permission to move every kind of tree, shrub, or bush, deciduous and evergreen! We limit the operation to the earliest days of November, and to the driest possible condition of the land. If a season be too late for roots, or the germs of rootlets to move at all, we gain nothing by a removal. It will be better to wait till February than to plant subjects, wounded in some roots, as they must be, and at the best entirely disturbed, in a cold fresh situation wherein they must remain in a torpid state, exposed perhaps to a swamp created by snow and sleet drift, for three months.

CLOSING REMARKS.

The 20th day of October was genial, sunny, and drying; till then rain continued day after day. Operations were retarded; but such had been the drought of the land, that nothing short of a glut of rain could restore its average moisture.

Another beneficial result ought to be admitted. The wells are always low in autumn, and in the present year they, so far as our locality can be taken in evidence, had lost ten or twelve feet of water at a depth of more than 100 feet from the surface of the ground. Some feet have been regained since the last week, and this is of consequence, as it prepares for a spring and summer supply. They who, like ourselves, are frequently constrained to depend upon hard water, should be careful to draw or pump a considerable volume into broad open tubs or cisterns, and let it be exposed to air during twenty-four hours.

Oct. 20.

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR OCTOBER.

The weather, during nearly the whole of this month, has been extremely humid, even the time of year considered. In many parts of England such has been the abundance of rain, the lowlands have been laid completely under water; consequently, the progress of ploughing and sowing has been much impeded. On the uplands, however, farm operations have suffered comparatively little interruption, although it must be admitted more seed would have been committed to the ground had the atmosphere proved of a more favourable character than we have now to report.

As might be expected, the all-engrossing matter for serious consideration, since our last, has been the present and probable future state of the corn markets throughout Great Britain. Although we perceive that some difference of opinion has been expressed upon the subject, it is quite obvious that the majority of thinking and practical men are firmly convinced of the importance of "looking facts in the face," and acting thereon, rather than allow their better judgment to be biassed by the vapid and inconsistent statements which have found their way into some of the daily and weekly publications. We find many of the writers therein laying continued stress upon the produce of the present year's crop of wheat. They inform us that it is a *full* average one; and hence infer that we have abundance and to spare for the consumption of the people, until after the next harvest shall have been gathered. But assuming that we have a fair supply of English wheat on hand, what, we ask, is to make good the actual deficiencies in all descriptions of spring corn—barley, beans, and peas in particular? That the yield of those articles has been miserably small, not a doubt can be entertained; consequently, we are led to inquire how that deficiency is to be made good, in order that prices may have a downward, instead of, as at present, an upward tendency. Again, what can by possibility compensate us for the loss of more than a third of the potatoes? Fortunately for the consumers, there has been a very large quantity of foreign "bread stuffs" retained for home consumption this year, and which has partly compensated for the losses we have just alluded to. Still, if we reflect for a moment upon the position of France and some other continental states, we shall find room for a well-grounded supposition, whatever may be urged to the contrary, that a large portion of the Baltic, and even American, supplies of wheat and other corn, as well as flour, will henceforth be diverted from our markets. Be it observed, this is no idle assumption. France and other nations are now buying foreign grain to an unusually large extent; and thus has been enacted a rise in the quotations far beyond that in the ordinary run of years. It may, perhaps, be imagined that we are labouring under the impression that we are on the eve of a famine, and that, as a consequence, we shall have to contend with famine prices. No such thing. Common sense tells us that the supplies of grain already received since the beginning of the year have prevented a great drain upon the stocks held by our own growers; and further, that we are under a very different state of things than would have existed had the old corn law been in operation. Now the duties on foreign corn and flour have reached their lowest point; consequently, there is no inducement, especially as present prices are remunerative, for the importers to bond any portion of their arrivals. These parties are, therefore, playing "a sure game" with quick profits, and thus enabled to send out additional orders to meet the current demand. Here, then, we observe a great relief from that pressure which otherwise would have existed, and which must prove a great boon to the consuming classes generally. The position of America to supply us with almost unlimited supplies of wheat and flour, as well as

Indian corn, induces us to hope that no very material enhancement will take place in the quotations of wheat for some time hence; but that present prices are safe, not a doubt can be entertained. In expressing this hope, we are sure that we speak the sentiments of the English farmers, who desire not high and fluctuating, but fair and remunerative prices.

The actual causes of the potato disease still remain, notwithstanding the many elucidatory statements which have lately appeared in print relative thereto, a matter of doubt. That that disease was originated during the wet season of 1845 is quite evident; and we think that the excessive dryness of the present year has in no way contributed to arrest the progress of the epidemic. From the great losses which most of the growers have sustained, and the limited supplies which have for some time past reached our markets, we feel convinced that the value of that esculent will rule extremely high during the whole of the winter. Those at present realized are quite 100 per cent. above those at the corresponding period last year.

In the early part of the month many fears were expressed as to the fate of the turnip and carrot crop; but we have very great pleasure in stating that, with some few exceptions, it has gone on extremely well, and very few losses have been sustained; indeed, from personal observation, we may state that we are likely to have most abundant and extremely good supplies on offer for some time to come. This is a very important circumstance, as it cannot fail to alleviate the pressure that must be caused by the falling off in potatoes.

In the whole of our grazing districts the supply of pasture herbage continues large, and that of hay very abundant. The stock, therefore, has fared extremely well, though we have to notice the prevalence of disease in many parts of the country. There is one circumstance which sadly militates against the interest of the grazing community, viz., the unusually small number of sheep to be met with in almost every quarter, and which will account for the present unusually high rates at which that description of stock is now selling.

The corn and cattle markets have been in a very active state during the whole of the month, and the general quotations have had an upward tendency. All this, too, has taken place in spite of the increasing importations from abroad.

In Ireland and Scotland a great demand has existed for all agricultural products, and the quotations have experienced a further advance. The quality of the grain on offer has far exceeded that of many past years.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

The comparatively high prices at which both fat and store stock has been selling in the whole of our markets have induced the importers of foreign cattle to exhibit unusual activity in the past month; and we have to report the arrival—notwithstanding the boisterous gales, which have proved most disastrous to the shipping employed in bringing stock from Holland, several vessels having been lost, and upwards of 500 head of beasts, sheep, and calves sacrificed at sea—of an increased number from most quarters. And yet, owing to the scarcity of home-fed sheep, our various markets have been in a very active state, and higher prices have been again realized. The annexed table shows the arrivals into London and at the outports since the date of our last review:—

From whence.	Beasts.	Sheep & Lambs.	Calves.
Rotterdam....	1,097	3,943	147
Harlingen	741	2,518	50
Leer	99	40	—
Altona	38	—	—
Hambro'	191	33	3
Tonningen ..	319	17	—
Flushing	—	217	—
Antwerp	—	—	18
Total	2,485	6,768	218

At the outports the following receipts, in which are included the totals of the various kinds of stock, have taken place:—

	Head of Stock.
Plymouth	91
Newcastle	598
Hull	2,628
Yarmouth....	650
Bridlington	140
Total	4,107

From the above it will be seen that not less than 13,578 head of stock have arrived in England in twenty-six days. Respecting the quality of these immense imports—only a small portion of which has been on sale in Smithfield and the various local markets, from the fact that the beasts and sheep have been mostly purchased as soon as landed—we may state generally that the beasts have been in full average condition, and that a great improvement has been observed in that of the sheep and calves; indeed it is quite evident to us that in another season or two, when the full weight of these arrivals will be felt, we shall be enabled to import both beasts and sheep equal in quality to those produced in this country. We find the foreign stock imported a few months ago, in a lean state, still in the hands of our graziers; and though, from their large appetites, we conceive they will not turn out a very profitable speculation, they are thriving remarkably well. From Hambro' about 50 baskets of meat have come to hand into London, and which has sold at prices varying from 2s. 10d. to 3s. 6d. per 8lbs. As comparisons are useful and instructive, we here give a statement of the imports in October, 1845 and 1846—

October, 1845.

	Beasts.	Sheep.	Calves.
London....	629	1,621	27
Outports ..	514	—	—
	1,143	1,628	27

October, 1846.

	Beasts.	Sheep.	Calves.
London....	2,485	6,768	218
Outports ..	2,000	2,000	107
	4,485	8,768	325

This comparison show an increase in the past month over that of 1845 of not less than *ten thousand seven hundred and eighty head!*

There has been a very steady sale for both beef and mutton in Smithfield. The former article has advanced 2d., the latter 4d. per 8lbs.; and good clearances at that amount of improvement have been effected on each market-day. The numbers have been as under—

	Head.
Beasts..................	19,254
Cows..................	456
Sheep..................	118,210
Calves..................	1,504
Pigs..................	3,740

The above exhibits a large excess in the numbers of beasts compared with former seasons, but a great falling off in sheep, as is thus shown:—

	Oct., 1844. Head.	Oct., 1845. Head.
Beasts	14,000	17,781
Cows	500	473
Sheep	162,000	120,370
Calves	1,260	1,385
Pigs	1,429	2,601

Comparison of Arrivals of Beasts.

	Oct., 1845. Head.	Oct., 1846. Head.
Northern counties....	9,600	9,030
Eastern do.	1,500	800
Western do.........	2,100	3,800
Other parts of England	1,450	2,000
Scotland...........	530	200
Ireland	300	200

Comparison of Prices per 8lbs., to sink the offal.

	Oct., 1844.		Oct., 1845.		Oct., 1846.	
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Beef, from	2 6	to 4 0	2 4	to 4 2	2 8	to 4 2
Mutton ..	2 8	4 0	3 4	5 0	4 2	5 4
Veal	3 4	4 4	4 2	5 4	3 8	4 8
Pork	2 6	4 0	3 10	5 4	3 10	5 0

At the principal country fairs extravagantly high prices have been paid for nearly every decription of produce, store stock in particular; and it is to us a matter of considerable doubt, seeing the immense consumption going on, the result of increased employment enjoyed by our operatives and others, whether prices will recede for some time hence. At all events, such appears to be the impression entertained by the principal graziers, or they would not willingly have risked their capital at such a period without feeling pretty sure of a fair return.

Up to Newgate and Leadenhall markets the arrivals of slaughtered meat have been trifling; but the supplies on offer killed in the metropolis have been moderate. Generally speaking the demand has ruled steady at higher rates. Beef has sold at from 2s. 8d. to 3s. 8s., mutton 3s. 8d. to 4s. 8d., veal 3s. 8d. to 4s. 6d., and pork 3s. 10d. to 5s. per 8lbs. by the carcass.

AGRICULTURAL QUERIES.

IS SALT USEFUL IN FATTENING AND OTHER STOCK?

TO THE EDITOR OF THE MARK LANE EXPRESS.

Sir,—The above query is put with the view of eliciting the truth. It seems a much disputed point. Professor Liebig says, "In fattening, salt must be avoided." Professor Johnston tells us that "the benefits so often derived from the use of salt in the feeding of stock show how a judicious admixture of saline matter with the food may render its other constituents more available than they would otherwise be to the support and increase of the animal body." Other writers on the subject differ as much as those I have named. It would be well if some agricultural chemist would favour us with his opinion and reasons, and if some feeder, who may have tried salt with sheep or oxen, would give his results to the public, he would much oblige Isaac.

Oct. 11.

TROUBLESOME WEED TO ERADICATE.

Sir,—Myself and my neighbours being much annoyed with the weed termed "corn horsetail," I should feel much obliged if you would ask some of your readers to favour us with the information as to how we should proceed for the best and most effective way of eradicating the same. I am, Sir, yours truly,

Oct. 6. A Salopian.

STEEP FOR WHEAT.

Sir,—In Suffolk, and some other parts of England, I am informed that a solution of blue vitriol is much used for the prevention of smut. Being alike ignorant of the plan pursued, and the effect produced by the blue vitriol, I shall feel much obliged if, through your publication, I am enabled to gather any information on the subject. I am, Sir, yours &c.,

Oct. 15. AN OLD SUBSCRIBER.

SIR,—Being about to build tanks for liquid manure, I venture to ask some information on the subject.

1st. What is the best size?

2nd. What is about the probable expense of that size?

3rd. How many gallons per cow or horse is requisite, supposing the urine only is caught?

4th. How long should the urine remain in the tank?

5th. What is the best time for putting it on the land?

6th. In what quantity?

7th. Whether diluted or not?

8th. For what crops is it most useful?

By answering these questions, or any of them, you would much oblige your most obedient,

A YOUNG FARMER.

SIR,—Having this year grown some naked barley, or barley wheat, I shall feel obliged by any of your correspondents informing me if it is as good for making malt as the common kind, and what difference, if any, in the process of malting. I am, sir, your obedient servant,

Lancaster, Sept 26, 1846. B. H.

SIR,—Seeing the dahlia root recommended recently as a substitute for the potato, I selected three or four tubers from a root and had them served up as potatoes. They looked very nice it is true, but the taste and scent were far from agreeable. I may not have hit on the right method of cooking them, but, from my first experience, am of opinion that under no circumstance is it fit for human food. Can you, or any of your readers, inform me whether the yam has been introduced into this country as an article of produce, and with what success? If successful, where obtained?

Glemsford. A CONSTANT SUBSCRIBER.

SIR,—Will you have the goodness to intimate in the next number of your most valuable Paper what sort of *artificial* manure you consider best for spring cabbages, as I am now about to take up my mangel wurzel crop, and mean to plant the same ground with nonpareil cabbage, of which I have now many thousand plants ready. Taking the list of manures from the Farmer's Vade Mecum, the invaluable almanac of Johnson and Shaw, I try to name for your election guano, salts of ammonia, bone-dust, Poittevin's dessicated compost, cubic petre, Daniel's manure, Lance's carbon and humus, saltpetre, soot, sulphuric acid, the urate of the London Manure Company, and potass.

It may be proper to add, my land somewhat approaches a loamy, light soil, and has been dunged for the mangel wurzel. Should you have the kindness to afford me the information, I respectfully solicit you will please to state the quantity per acre you would recommend. Owing to the high price of vegetables in this locality, I mean to put a dressing of farm-yard manure on the same land next June, when the cabbages are taken off, to prepare it for another crop; but now I have none to spare, so must buy some artificial, and wish to have the best for one crop. I am your's,

A CONSTANT SUBSCRIBER.

ANSWERS TO AGRICULTURAL QUERIES.

ANSWER TO THE ABOVE.

Your question concerning the "sort of artificial manure" which we consider best "for spring cabbage" is very readily answered, if—as your description seems to imply—your soil corresponds with, or even makes a near approach to, one which was the subject of direct experiment during the last spring. Any good loam will profit by the treatment shortly to be described; but first we beg to premise that all the cabbage family derives great advantage from fresh turned earth. Whether it be that brought up from below—that portion which had never previously been brought to light—or by the introduction of new soil from a common, a field, &c., which had not been manured and cropped for garden produce, the fact is indisputable that in such new soil cabbages will be sweeter, more juicy, and more verdant than if otherwise treated, with all the skill of the cultivator.

Last autumn a plot of garden ground was digged, but with only a moderate coating of compost leaf and farm manure, and planted with York cabbage in regular rows. The plants went on pretty well, but mild as was the winter, there were no early cabbages. The drought and heat of May set in, and then the intermediate spaces were hoed. Two substances were resorted to as artificial aid. One half was top-dressed with a fair but cautious sprinkling of Potter's guano—of which bone-dust and sulphate of ammonia appear the chief ingredients: after a day or two it was worked in by the hoe, and water was given. The other half was treated with fine Peruvian guano, purchased at 12s. 6d. per cwt. The lumps were reduced, and about 1½ oz. mixed up (we cannot call it dissolved) with a gallon of water; and this quantity was given to every two plants. The soil being superficially loose, the fluid percolated, and flowed over and down to the roots. In a few days, under a burning sun, with heat above 80°, warm nights and no rain, the plants rallied, and progressed beyond expectation—they hearted, and some became very large. The plants treated with the bone-dust, &c., did not so progress; but one similar watering with liquified guano soon set them going.

If we assert that through the summer months 1½ oz. of guano was thus afforded to each plant, the extent will be given. These cabbages were cut three times; the same bed remains, and the plants have still fine, sweet-flavoured hearts.

The experiment is so conclusive that no other artificial aid was sought, and as our own direct analyses prove that the guano contained much ammonia, phosphates of ammonia—of lime in a state of the finest impalpable powder—sulphates and muriate of soda and potassa, plenty of uric acid and urea, what other manure (always excepting farm, and fold, and night-soil) could one desire? True, sound guano is comprehensive beyond competition, and excepting bones acidulated, for other purposes, a garden or field can find no one compounded manure so entirely useful.

STEEP FOR WHEAT.

SIR,—The plan I adopt is as follows:—My quantity is half a pound per bushel of wheat, and it is dressed with it in the following manner. Fifteen gallons of water are heated in a copper, and just before the liquor is boiling, 16lb. of sulphate of copper is put to it *gently*, for if it is put in all at once it will so effervesce as to boil over the water. In about 10 minutes the sulphate of copper will be dissolved, when the compound is poured *boiling* over the wheat, and briskly mixed with it; by giving it three or four turns over, each kernel will be saturated; the wheat is then heaped up, and in two or three hours it will be sufficiently dry for drilling. My usual practice is to wet over-night sufficient for the next day's drilling, but very often I wet 8 or 10 quarters at once, as it will receive no injury from lying *even a year*. This I proved last year by sowing more than a bushel which I had left from the previous year's dressing.

Childerditch Hall, Oct. 29. J. F. BUTLER.

PROPERTIES OF LIME AS MANURE.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

Sir,—In your valuable number for the month of October, amongst other agricultural queries, I notice one by "A Constant Reader," inquiring as to the true properties of lime as a manure, and whether it is best adapted to rich land or poor; also inquiring what are the true effects of lime upon *exhausted soils,* and is lime in itself *truly a nourisher of plants?*

To the latter query I can from observation remark, that it unquestionably is, in the manner I applied it.

On a clover ley which I intended to fallow for wheat and vetches—but which, from the failure of last year's plant of clover, I have since made up my mind to plough only a portion of—I had commenced liming for winter and spring vetches, some six or seven weeks ago. I got it spread *hot* upon the sward, and part—that for the winter vetches—ploughed in. About half an acre is not yet ploughed, and to an inch I may say, where the lime has been applied you can discern the *great* difference in the herbage. On clover leys frequently you may discover the soil or colour of mould, when the plant is not very thick. This was the case with mine, although I had a heavy crop of clover this year; but upon the part not ploughed, the lime, which I attribute it to, has brought up grasses, and facilitated the growth of the clover plant much beyond my anticipation.

I had read some time since of lime recommended as a top-dressing for sward and meadow-land, and am now satisfied that the greater part of our farmers are not acquainted with its fertilizing qualities. I believe it to be, upon meadow-land, *wet* or *dry*, applied at the proper season of the year, an excellent stimulant to vegetation, and well worthy the attention of farmers generally.

I am, sir, your obedient servant,
An Old Subscriber to, and Reader
of, your Magazine.
Usk, Monmouthshire, Oct. 14.

BLUE VITRIOL.

A correspondent gives the following answer to "An Old Subscriber:"—Shoot down upon a stone or brick floor one quarter of wheat; sweep well up into a conical form, open the heap in the centre, and have ready *boiling* water; fill two buckets nearly to the brim, but allowing for a shovel-full of quick lime to be put in to each; after one stir, pour into the hole made in the heap, but not the dregs of the buckets. Now the quantity of vitriol I use is half a pound to each quarter of wheat, but I know one pound will not injure it; this is simply ordered of the chemist in half-pounds ready powdered, and to each process of one quarter of wheat dressing with lime and hot water as above, add to the puddle the vitriol first dissolved in hot water in a vessel during the operation.

POOR CLAY SOIL.

To "Constant Reader."—The first step that you ought to take with your "poor clay soil" should be, to completely drain it, and then to pare and burn the surface. The more clayey your soil is, the deeper you ought to burn. The residue from the burning, when mixed with the soil to the depth of a furrow, by acting as a coarse sand, makes the soil more friable and porous, and will permanently improve it; and there is no doubt you will then be capable of producing on your at present profitless land a luxuriant crop of almost any kind.

Yours, &c., Old Reader.
Oct. 14.

Composts with Urine.

Sir,—Mr. Walters, in a letter of September 14th to you, wishes for information respecting "compost heaps from urine." Mr. W. cannot do better than follow out the plan originally devised by Mr. Dixon, of Hathershaw, which is as follows: Make a receptacle at the back of the cattle stalls just outside the building, capable of holding about twenty cart-loads of mould, or any other matter to be employed: the receptacle must be a little lower than the cattle sheds, and all the urine will pass into it, and will remain there until the mass is saturated, which is all that is required: when the earthy matter becomes covered over, the compost may then be thrown out, and the proceeding again renewed.

Mr. Dixon observes, in order to show part of the benefits of this practice, "that the most foul or weedy mould may be used: the action of the urine, if not reduced by water, is so powerful that wire-worms, the black slug, many other destroying insects, and all vegetables, weeds, &c., when in contact with the urine for a time, are killed." The situation for raising this compost should be protected from the weather by a covering similar to a cart shed.

I am, Sir, yours, &c.,
Oct. 3, 1846. Agrarius.

Sir,—In your last number your correspondent "A Young Farmer," asks information on the building of tanks. I append the following answers to his queries:—

1st. The size must vary according to the number of stock kept, but it should contain the whole supply for three months, which will be about 700 or 800 gallons per head in that period.

2nd. Supposing 30 cattle to be the number of stock kept, and 800 gallons of urine to be given off by each, the tank must contain 24,000 gallons, which may be constructed at the expense of 30*l.* to 40*l.*; stone or brick walls, stone flagged bottom, and stone-arched roof, according to the situation and nature of the ground to be excavated, and the proximity and cost of materials, &c.

3rd. Cannot understand the query properly, therefore decline answering it.

4th. It should remain in the tanks until a proper opportunity occurs for applying it to the crops.

5th. In the spring and summer months especially, but it may be applied with great advantage at almost any period of the year.

6th. 2,400 to 3,500 gallons per acre.

7th. Dilute with at least one-half its bulk of water, and thus increasing the size of the tank one-third.

8th. On all descriptions of crop I have seen it applied with signal success, but for the seedling and other crops it is peculiarly adapted.

On any other point connected with the subject, I shall be happy to afford your correspondent any information I possess. A. Y. F.
Oct. 15.

Sir,—Having been burning a quantity of weeds, I am anxious to know the best method of applying the ashes as a manure for wheat. Would mixing them with night-soil and drilling with the seed answer upon clay soils? Or would it be better to apply them in the spring as a top-dressing, mixed with night-soil and pigeon manure? Hoping some of your correspondents will enlighten my ignorance, I am, sir, your obedient servant, J. Sutton.

REVIEW OF THE CORN TRADE

DURING THE MONTH OF OCTOBER.

The following statement of the quantities of wheat sold and returned at the towns which furnish the materials for compiling the averages, during the six months ending the middle of October, in the years 1846 and 1845 respectively, may prove of interest to our readers. The table in question is calculated in the first place to show that farmers have not held back supplies, but, on the contrary, that the deliveries have ever since harvest been on a liberal scale; and further, it would appear from this statement that the stocks of old wheat were well nigh exhausted when the new crop was gathered, for whilst there is a great increase in the quantity sold, in 1846, in September and October, as compared with the sales of the corresponding months in 1845, the case was precisely the reverse prior to that time, the sales having previously been much larger in 1845 than in 1846. The inferences to be drawn from these facts are, we think, perfectly plain; firstly, that in the autumn of last year there was more old wheat in the country than at the same period of 1846; and further that the late advance in prices has induced farmers to bring forward their new wheat so freely as to leave less on hand than in ordinary seasons. The returns on which the foregoing remarks are based stand as follows:

Sold at the towns furnishing the materials for compiling the weekly averages.

Week ending,	1846.	1845.
April 30th	118,357	115,876
May 7th	129,205	118,052
,, 14th	129,169	121,574
,, 21st	115,681	121,695
,, 28th	78,064	122,060
June 4th	79,001	117,486
,, 11th	88,378	120,143
,, 18th	87,508	108,254
,, 25th	89,178	109,041
July 2nd	91,886	102,358
,, 9th	86,885	98,243
,, 16th	93,649	105,629
,, 23rd	95,185	117,093
,, 30th	107,922	118,666
Aug. 6th	100,846	139,009
,, 13th	89,355	165,574
,, 20th	66,306	172,628
,, 27th	80,277	162,977
Sept. 3rd	121,446	145,450
,, 10th	152,291	109,043
,, 17th	152,307	79,780
,, 24th	179,876	98,705
Oct. 1st	170,123	127,104
,, 8th	184,346	156,811
,, 15th	190,409	161,022
,, 22nd	159,005	178,368

If the foregoing deductions be correct, we must come to the conclusion that the stock of home grown wheat in the United Kingdom, is at present smaller than is at all usual so shortly after harvest, and that a considerable importation of foreign would therefore have been required, even if there had been no loss of food by the extensive failure of the potato crop. The rise which has taken place in the value of all kinds of grain within the last two months is, therefore, in our opinion, fully warranted by circumstances; and we cannot help thinking that a still further enhancement is a much more likely occurrence than a reaction. All that we have been enabled to learn with regard to the yield of the different kinds of corn confirms our former impression, viz., that with the exception of wheat, the harvest of 1846 has turned out deficient. Many well-informed practical agriculturists maintain that the produce even of wheat will hereafter be found to fall short of an usual average; whilst oats and barley are admitted on all hands to have given an indifferent return, and the crops of beans and peas are computed at only half the usual growth. Meanwhile each day proves more and more clearly that the potato murrain has been far more destructive than was at first imagined, and there is consequently too much reason to fear that great misery and want will be experienced during the approaching winter by a very considerable proportion of the poorer classes of society.

The rise in the value of wheat has amounted to about 20s. per qr. within a period of little more than two months. Immediately after the conclusion of harvest very fine new wheat was sold in the Lincolnshire and Cambridgeshire markets at 43s. to 44s. per qr., whereas the present quotations at Wisbeach, Boston, Spalding, and other shipping ports on the east coast, are 62s. to 64s. per qr. free on board for good qualities; it cannot, therefore, be deemed surprising that farmers who in the first instance did not reckon on obtaining much over two pounds a quarter, should have brought supplies freely to market; but we have now arrived at a period of the year when the preparation of the soil for autumn sowing claims attention, and a material falling off in the deliveries must consequently be expected.

As yet comparatively little progress has been made with out-door work; in the early part of the month the soil was too hard and dry to admit of much being done, and the subsequent heavy rains saturated the land to such an extent as to render it unfit for being immediately ploughed; the last few days have, however, been fine, and should there be no return of wet, all hands will be speedily required in the fields. The present remunerating price of wheat is likely to induce farmers to sow this grain extensively, and a large demand for fine qualities for seed may therefore be calculated on, which, with the enormously great consumption of bread now going on, in consequence of the high price and bad quality of potatoes, will, we think, occasion existing rates for the former article to be at least supported.

When first the potato murrain began to be talked of, we were inclined to question the truth of many of the statements put forth; but since the digging of this important crop has commenced, we have been furnished with ample proof that the mischief done by the rot has not been over-rated. The yield will, we fear, scarcely reach half of the usual produce, even in the most favoured districts, whilst in some localities the loss is almost a total one. It is difficult to foresee the extent of the evil which may result from so great a loss of food, and it is perfectly clear that the value of all kinds of provisions must be so far influenced thereby as to render low prices nearly impossible until another harvest shall have been gathered. We shall here close our speculations as to the probable future, and give our readers some account of the occurrences at Mark Lane during the current month.

The arrivals of wheat coastwise into London have been very liberal, averaging nearly 10,000 qrs. per week during the first three weeks of the month. The consumption of the metropolis has been great, but not to the extent of the supplies; and the millers and bakers are at present better stocked than they have been at any previous period for many months past. This is a fact which should not be lost sight of, as it is likely to influence their future operations for a time, and may be the means of preventing any further immediate advance. The trade in wheat has not been so animated in October as it was in September, and the actual rise has not exceeded 4s. to 5s. per qr. At the close of the last-named month the top quotation of white wheat at Mark Lane was 68s. to 70s., and that of red 60s. to 63s. per qr. On Monday, the 5th inst., an advance of 2s. to 3s. per qr. was established; but even then the demand from the town millers had slackened, and had it not been for some important purchases made by merchants, the stands would probably not have been cleared. During the following week business remained quiet; and though prices have since got up 1s. to 2s. per qr., the enhancement has been so unwillingly complied with as to give a somewhat heavy tone to the trade. The wheat bought by the merchants is believed to have been taken for shipment to the north; but whether these purchases have been speculative or to satisfy immediate wants, we are unable to say. Hitherto very little grain of any kind has been bought in the London market on Irish account; Liverpool, as being the more convenient port, having attracted the buyers from the sister isle. As, however, stocks have been much reduced there, we should not be surprised if Lancashire should hereafter have to draw supplies from the metropolis. We have still a good stock of old foreign wheat in granary here; very little above one-third of the 600,000 qrs., on which duty was paid at this port on the present corn law coming into force, having passed into consumption. Of the remaining 350,000 or 400,000 qrs. a large proportion consists of low qualities, better suited for the manufacturing districts than for the London market; and we are disposed to believe that a portion of the same will ere long find its way to the north.

The business done in foreign wheat has not been extensive this month; which may be partly accounted for by the fact of the new English having come to hand in such excellent condition as to be almost fit to grind without any admixture of old. The very wet weather lately experienced is, however, likely to make an alteration in this respect, as there can be no doubt that the damp state of the atmosphere will have its usual influence on the corn of this year's growth. Some falling off has already taken place; and the condition of the English wheat brought to market within the last week has been less dry and hard than that of previous supplies. Under these circumstances an improved demand for foreign wheat may be calculated on; though, as already remarked, there has as yet been comparatively little doing in the article. In the early part of the month prime high mixed Danzig and the best sorts of Lower Baltic red rose about 2s. per qr., which advance has not since been exceeded. Meanwhile holders have displayed great firmness; and they appear perfectly satisfied to wait their time. The arrivals from abroad have been insignificant during the month; and from all we have been able to learn we are inclined to believe that no very important supplies will reach this country either from the Baltic or the Mediterranean ports till next spring. Independent of the obstacle which the high value of the article all over the continent of Europe must throw in the way of getting supplies, the scarcity of shipping, the high freights, and the greatly increased premiums of insurance, will all tend to discourage shipments. The quantity in bond in the kingdom is quite insignificant at present; and the fall in the duty to 4s. per qr. (the minimum point under the existing law), has therefore failed to have any influence on prices of free wheat.

The exports to France and Belgium have been checked by the increased value of the article at home; still a few cargoes have been dispatched during the month to the countries named. At the close of September flour was relatively lower than wheat; but when the millers became convinced that there was no prospect of the former article again receding in value, they advanced that of the latter so as to put the two on an equal footing. The top quotation is now, and has some time been, 60s. per sack for town made, whilst country marks have sold at rates varying from 48s. to 54s. per sack, according to quality.

The rise on American flour has been still more important; the best brands having lately commanded 36s. to 37s. per brl., duty paid, and proportionably high terms in bond.

The character of Indian corn as a wholesome article of food appears to be now fully established; and in proportion as its position in the estimation of the people has risen, so has the price advanced. In the early part of the year, before the potato murrain had manifested itself, Indian corn was obtainable both here and in Liverpool at about 25s. per qr.; now it is worth 50s. to 54s. at Mark Lane, and from 52s. to 56s. at Liverpool, and stocks nearly exhausted.

The arrivals of barley coastwise into London have hitherto been small, and prices have steadily tended upwards. Only a comparatively small proportion of the supply has consisted of really fine malting qualities; and the best samples have been in much request; for such 44s. per qr. was paid early in the month, latterly 50s., and in some instances even 53s. per qr. for choice parcels. Distilling sorts have not risen quite so rapidly; still the enhancement has been great upon all descriptions of barley, certainly not less, taking one kind with the other, than 3s. to 4s. per qr. since the close of last month. A good many orders have, from time to time, been sent to the continent for the purchase of this grain; and we expect supplies on rather a large scale will reach us from the Baltic ports and Hamburgh, if the shipments should not be stopped by an early setting in of winter.

A lively business has been done in malt; the stocks of this article have become very much reduced in all parts of the kingdom, in consequence of the very great consumption of beer by the numerous bodies of men employed in the formation of railways. It is computed that 200,000 men are at present in full work on the different lines in progress of formation, earning good wages; a large portion of which is expended in food and drink. This accounts in some measure for the extra consumption, and consequent rise in prices of all kinds of provisions, and likewise for the enhanced value of malt.

That the last crop of oats has fallen materially short of an average is now the general opinion; nor is the quality equal to that of ordinary seasons, particularly as regards Ireland. The quantity likely to be consumed in the shape of meal, both in that country and in Scotland, will naturally be much larger than usual, owing to the potato failure; hence we can scarcely expect to receive our accustomed supplies. The arrivals during the month have been decidedly short as well coastwise and from Scotland as from the sister isle, nor has any great quantity come to hand from abroad. The trade has, nevertheless, been the reverse of lively, the large dealers having manifested very great unwillingness to purchase more than has been absolutely necessary to supply their immediate wants. Notwithstanding the cautious manner in which they have conducted their operations, they have, however, been unable to prevent prices creeping up, and quotations are 2s. per qr. higher than they were when last we addressed our readers. Archangel oats have lately been selling at 27s. to 28s. Irish of this year's growth (of old hardly any have come to hand) at 28s. to 32s., and English and Scotch at from 28s. to 35s. per qr., according to weight, quality, &c. These are very high rates; still, from present appearances, we can discover no reason to expect a reaction; on the contrary, if Ireland should keep back her oats to feed her own people, a further advance is inevitable.

The supply of beans has not kept pace with the demand, and considerably enhanced rates have been obtained for English: at the close of September good new ticks were quoted 36s. to 38s., harrows 38s. to 40s., and pigeon 40s. to 42s. per qr. at Mark-lane, whilst the present value of each kind is at least 5s. per qr. higher. Egyptian beans have not risen in the same proportion, and are probably at this moment the cheapest article for feeding in the market. Tolerably good parcels may still be bought at 38s. per qr. duty paid, which at 56 lbs. to the bushel, the usual weight, gives 448 lbs. of good food for horses and other cattle; whereas oats, weighing 40 lbs. per bushel, or 320 lbs. per qr., cost at least 30s.

Peas have remained nearly stationary in value; indeed, as regards white boilers the tendency of prices has been rather downwards; very fine qualities having lately been sold at 56s. to 58s. per qr., being about 2s. per qr. below what they were worth last month. A good many purchases of this article have been made at Danish ports on British account, at very high terms; an operation, in our opinion, attended with considerable risk. It may be all very well if these purchases should arrive in this country before the winter sets in; but should the shipment be delayed so as to prevent the peas reaching their destination till spring, a great loss might attend the speculation, the demand for this description of food being usually confined to the winter months.

In taking our usual notice of the state of the grain trade abroad, we have in the first place to direct attention to America, that being the quarter from whence the largest supplies of bread-stuffs must be looked for. All the accounts hitherto received from the other side of the Atlantic agree in describing the yield of grain as very abundant, as well in the United States as in Canada; and by the arrival of the "Great Western," bringing New York advices of the 8th Oct., we learn that active preparations were in progress for shipping flour, wheat, and Indian corn on an extensive scale to the British market. The demand for vessels had been so great as to cause a considerable rise in freights, 3s. having been paid for Liverpool, and 3s. 6d. per brl. for flour for London. The utmost activity had prevailed in forwarding supplies from the interior; and there can be no doubt that a very considerable quantity of flour will reach us within the next month or two. Still we are inclined to think that the receipts from thence will not be so extensive as to produce any material effect on prices here. The Americans themselves do not appear much inclined to consign on their own account; and the orders sent out by British merchants seem to have been less numerous than we were led to expect. This is proved by the comparatively small rise which had taken place in the price of flour up to the time of sailing of the "Great Western," good brands of Genessee being then still quoted at 5½ to 5⅝ dollars per barrel, or 23s. 9d. to 24s. 3d. per barrel in English money. The next advices are looked for with great interest, as they will probably afford the means of judging what we may really calculate on receiving from that quarter.

The latest accounts from the Baltic confirm what has been previously stated respecting the smallness of the stocks of old wheat at the various ports of shipment and the difficulties likely to be experienced in obtaining supplies of any magnitude from thence, before the spring of next year. Letters from Danzig, of the 20th inst., inform us that vessels were very scarce there, and freights to Great Britain unusually high; for London and the east coast 6s. 3d. to 6s. 9d. per qr. had been paid, and a charter or two had been closed for Liverpool at 5s. 9d. to 6s. 3d. per qr. for wheat. This rise in freights, and an equal advance in the premiums of insurance, make the cost of transit to England quite 10s. per qr.; and the price of fine high mixed wheat having risen at Danzig to 60s., the value is relatively higher there than in the London market. Under these circumstances few will be inclined to enter into the speculation of buying there; and as the Danzig merchants have hitherto shown no disposition to consign, it follows that little dependence can be placed on receiving supplies of importance from thence. At the Lower Baltic ports there are absolutely no stocks of old wheat; and comparatively little of the new crop having been brought forward by the growers, owing to the bad state of the roads, scarcely any business has been done at those places from which the principal shipments of red wheat are usually made.

At Rostock the operations have been so unimportant as to render it difficult to say what prices it would be necessary to pay to succeed in securing any quantity. Few merchants were willing, on the 22nd (the date of our last advices), to enter into contracts to ship in spring below 54s. to 55s. per qr. free on board; and as no orders had been received at such high limits, hardly a transaction had taken place.

The accounts from Stettin, Stralsund, Wolgast, Anclam, Wismar, &c., are of a precisely similar character.

From Hamburg we learn that stocks of all kinds of grain had been greatly reduced by shipments to England, France, and Belgium, and that though orders continued to drop in from one or the other of these countries, the prices offered by local buyers had exceeded the limits of the foreign orders. For wheat equal to 52s. to 56s. per qr. had been paid for city use. Good Saale barley had brought 34s. to 35s., and oats 21s. to 23s. per qr.

All over France, Holland, and Belgium, there appears to be great scarcity of food, and it is quite certain that these kingdoms will have none to spare for export; indeed, the probability is, that they will, like ourselves, have to import largely from America, the Baltic, or the Black Sea, and thus prevent us obtaining what we may require, unless we are prepared to outbid them.

CURRENCY PER IMPERIAL MEASURE.

OCTOBER 26.

WHEAT, Essex and Kent, new, red	63	68	White ...	60	67	75
Old, red	65	69	Do......		66	73
RYE, old	34	36	New.....		36	38
BARLEY, Grinding 36 40 Malting	44	50	Chevalier		48	52
Irish	—	—	Bere		—	—
MALT, Suffolk and Norfolk......	70	74	Brown ..		70	—
Kingston and Ware	70	74	Chevalier		70	74
OATS, Yorksh. & Lincolnsh., feed	27	30	Potato ..		32	—
Youghall and Cork, black..	25	26	Cork, white		26	30
Dublin	25	28	Westport		28	—
Waterford, white	26	28	Black ...		24	26
Newry	30	32	Galway..		23	26
Scotch, feed..	28	30	Potato...		30	32
BEANS, Tick, new	40	44	Old, small		48	52
PEAS, Grey	46	—	Maple ..		46	—
White	56	60	Boilers ..		57	60

FLOUR, Town-made 55 60 Suffolk 50 per sack of 280 lbs.
Stockton and Norfolk 40 50 Irish -

FOREIGN.

WHEAT, Dantzic	60	70	Fine	71	74
Hamburg	56	60	Rostock	60	66
BARLEY	32	34			
OATS, Brew	32	34	Feed	24	26
BEANS	38	44	PEAS	50	56
FLOUR, American, per brl.	34	36	Baltic	—	—

COMPARATIVE PRICES OF GRAIN.

WEEKLY AVERAGES by the Imp. Quarter, from the Gazette, of Friday last, October 23rd, 1846.	s.	d.	AVERAGES from the corresponding Gazette in the last year, Friday, October 24th, 1845.	s.	d.
WHEAT	59	10	WHEAT	58	2
BARLEY	38	8	BARLEY	32	0
OATS	25	8	OATS	23	5
RYE	38	3	RYE	34	5
BEANS	45	5	BEANS	44	5
PEAS	47	3	PEAS	43	0

IMPERIAL AVERAGES.

Week ending	Wheat.		Barley.		Oats.		Rye.		Beans.		Peas.	
Sept. 12th	50	0	33	7	23	5	32	4	40	11	38	10
19th	51	3	36	1	23	7	33	0	41	6	40	5
26th	53	1	36	10	23	7	35	7	42	7	45	0
Oct. 3rd	54	0	36	9	24	3	35	5	43	4	45	4
10th	56	10	37	2	24	7	35	9	43	7	46	7
17th	59	10	38	8	25	8	38	3	45	5	47	3
Aggregate average of the six weeks which regulates the duty.	54	2	36	6	24	2	35	0	42	11	43	11
Duties payable in London till Wednesday next inclusive, and at the Outports till the arrival of the mail of that day from London	4	0	2	0	1	6	2	0	2	0	2	0
Do. on grain from British possessions out of Europe	1	0	1	0	1	0	1	0	1	0	1	0

PRICES OF SEEDS.

OCTOBER 26.

Feeding Linseed was in much request, and was worth 48s. per qr. Cakes also brought high rates, say 13*l.* to 13*l.* 10s. per 1000. In Canaryseed, Mustard, Carraway, and Corriander there was not much passing, nor were the transactions in Cloverseed or Trefoil of interest.

Rapeseed, 22*l.* 24*l.* Irish, —*l.* —*l.*
Linseed, Baltic, 44 48 Odessa, 45 48
Mustard, per bush., white 8 10 brown, 9 10
Linseed Cakes, English 13*l.* 13*l.* 10s. per 1000
Linseed, English, sowing 50 60 crushing 44 48 per cwt.
Carraway, 41 43 new, 42 44 Coriander, 10 13
Hempseed, 35 38 per qr. Trefoil, 17 19
Canary, 55 58 fine, 60 62 Tares, winter, 6s. 0d.

HOP MARKETS.

BOROUGH, MONDAY, Oct. 26.

There is no alteration in the Hop market since our last, worthy of note. A general impression prevails that the duty is not overset at £220,000. Some think it will exceed it.

POTATO MARKET.

SOUTHWARK, WATERSIDE, Oct. 26.

The supply to this market since our last report has been exceedingly small, but there have been a few small cargoes arrived coastwise from Lincolnshire and Yorkshire, and from Kent and Essex. The various railways are daily contributing to supply the London market; there are also some arrivals by the Hull steamboats; yet the weight is in considerable, and consequently the prices are high. York Regents, 140s. to 160s.; do. Shaws, 130s.; Kent and Essex Regents, 140s. to 180s.; do. Shaws, 120s. to 140s.; do. Kidneys, 140s.; Lincolnshire Regents, 130s. to 140s.; do. Shaws, 120s. to 130s.

BUTTER MARKET.

OCT. 26.

We note a dull trade, and to effect sales somewhat lower than the nominal prices must be taken. Fine Dorset, 108s. to 112s.; middling, 96s. to 102s.; Devon 100s. to 104s.; fresh, 10s. to 13s. per dozen lbs.

WOOL MARKETS.

BRITISH.

LEEDS, Oct. 23.—There has not been any increase in the sales of wool this week. In prices we do not quote any alteration.

WAKEFIELD, Oct. 23.—There is no new feature apparent in this trade; the demand continues limited, and prices nominally the same as last reported.

LIVERPOOL, OCT. 24.

SCOTCH.—There has been a little more inquiry for Laid Highland this week, as also for white Highland. In Crossed and Cheviot, the few transactions have been about late rates.

		s.	d.		s.	d.
Laid Highland Wool, per 24lbs		7	9	to	8	3
White Highland	do	11	0		11	9
Laid Crossed	do.. unwashed	9	6		11	0
Do.	do..washed	9	9		12	0
Do. Cheviot	do. unwashed	10	0		12	6
Do.	do..washed	12	0		15	6
White Do.	do	21	0		24	6

FOREIGN.—The small public sale of East India and Egyptian wool that took place here on Thursday was well attended, and those sold realized about former rates. The half of the Egyptians were withdrawn.

FOREIGN.

CITY, Oct. 26.—The wool market is in rather a dull state, and prices are barely supported.

In accounts received from Leipsic, dated the 16th instant, it is stated that the sale of English fabrics had been moderate, and that further orders were expected.

LEEDS, Oct. 23.—There has been more business done in foreign wools this week than during the fortnight or three weeks preceding, and prices remain the same.

BARK.

Per load of 45 cwt.

English, Tree	£12	0	0	to	£13	10	0
Coppice	13	0	0		14	0	0

LIVERPOOL (DUTY FREE).—Quercitron, 3*l.* 6s. to 10*l.*; Dutch Oak, per ton, 4*l.* to 5*l.*; German, 8*l.* 10s. to 6*l.*

NOTICES TO CORRESPONDENTS.

"A Member of the Grantham Farmers' Club" will find the information he requires in "Johnson and Shaw's Farmers' Almanack."

A Correspondent suggests the planting ash-trees about eighteen inches or two feet from hedgerows and each other. Should his views be carried out, it would be but perpetuating that which is justly considered the greatest evil to farmers, the growth of timber in hedge-rows.

In answer to an "Old Subscriber," we beg to observe that there are a great number of farmers who are not members of the Royal Agricultural Society, and who do not see their publication; therefore, we think it necessary to distribute to them the most useful information, from whatever source derived.

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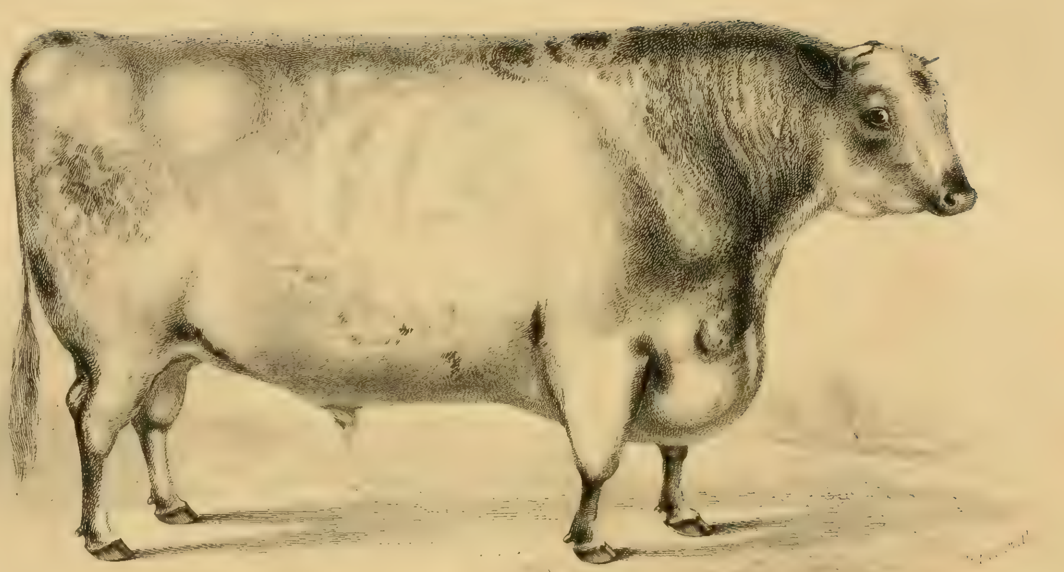

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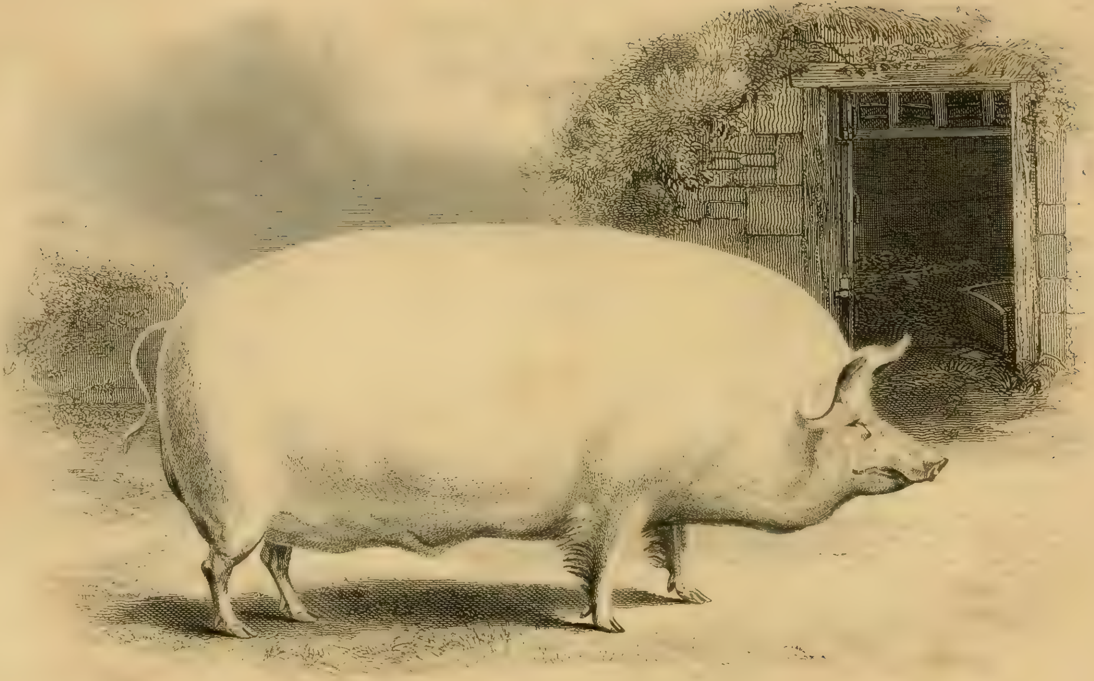

A Boar of the large Breed.

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THE FARMER'S MAGAZINE.

DECEMBER, 1846.

No. 6.—Vol. XIV.] [Second Series.

PLATE I.

BELLEVILLE; A Short-horned Bull.

Belleville (6778), roan, calved May 14, 1843, bred by and the property of J. Mason Hopper, Esq., of Newham Grange, Stockton-on-Tees; got by Newton (2367), d. (Ganymede) by Uptaker (5534), g. d. (Garland) by Matchem (2281), gr. g. d. by Fitz-Remus (2025), gr. gr. g. d. by Cato (119), gr. gr. gr. g. d. by Whitworth (695), gr. gr. gr. gr. g. d. bought of Mr. Mason, of Chilton.—Vide "Coate's Herd Book," vol. vi., p. 18.

Belleville has been recently proved by "authority" the "invincible," from the circumstance of his having won in the present year four of the most important prizes in the United Kingdom, an instance we believe unprecedented; commencing his brilliant career at the meeting of the Royal Agricultural Society, at Newcastle-upon-Tyne; next the Great Yorkshire Society, at Wakefield; then the Royal Irish Improvement Society, at Limerick, (with the Challenge Cup of 100 Sovereigns for the best of all the classes); and last, not least, the Highland Agricultural Society of Scotland, at Inverness.

"Ganymede" was from the same cow as Cassandra, the dam of the celebrated prize bulls Clementi, Collard, and Cramer; Captain Shaftoe was also bred from the same stock, viz., that of Mr. Shaftoe, of Whitworth Park, near Durham, who had them originally from Mr. Mason, of Chilton, and continued to breed them principally from his bulls.

PLATE II.

BOAR OF A LARGE BREED.

This animal was exhibited at the meeting of the Royal Agricultural Society at Newcastle-upon-Tyne, in July last, by Mr. Richard Hobson, of Park House, Leeds, and obtained the first prize of Fifteen Sovereigns as the best boar of a large breed.

ON THE IMPROVEMENT OF THE COTTAGES OF THE AGRICULTURAL LABOURERS.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

The dwellings of the labourers of agriculture, their situation, healthiness, and comfort, are questions not so often regarded as the importance of these questions imperatively demand. An examination, therefore, of a few well ascertained facts, closely connected with their improvement, will surely tend to some good. We shall perhaps, too, find, as we carefully pursue our inquiries, that several of the results of these may be beneficially acted upon in the choice and improvement of even our own dwellings.

It is almost impossible to examine the cottages in which the poor reside, in any district, without being convinced of the utter disregard of health and comfort very generally evinced in their construction. The site, their drainage, the size of their rooms, their ventilation, are in too many instances alike disregarded. The constructers of these it is true have produced—"a cottage," but it would seem that there all their care terminated—the tightness of the walls, the dryness of their floors, the ventilation of their rooms, the size of these, the healthiness of the soil on which they rest, the shelter and aspect of the house, the removal of sewage, being points which never seem to have presented themselves for the builder's consideration. If cottages were to be built, it seemed as if in his opinion it sufficed if they were placed in situations where *labour* was *needed*, and the ground *cheap*. The *nature* of that ground, whether well elevated above, or near to the level of stagnant waters, or other disease-producing localities, is too commonly to such persons quite immaterial. And yet the shortsightedness of thus acting seems most extraordinary; the fevers thus produced, the expense consequently often entailed upon the employer of the tenant dwelling in such houses, we might reasonably conclude would prompt all owners of cottages to be more attentive to avoid such errors. That these are not imaginary consequences of the neglect to which I have alluded, every medical man can bear testimony. "We would refer in the first instance," said her Majesty's Commissioners, appointed to inquire into the health of towns, in their first report, p.10., "to the evidence of Dr. N. Arnott, and Dr. Southwood Smith, who have stated to us the results of their continued and latest observations; and also the evidence of Dr. Guy, Dr. Aldis, Dr. Rigby, and Mr. Toynbee, who have had extensive practice in hospitals and dispensaries. This evidence, with that of Mr. Ward, displays their opinion and experience, that defective drainage, neglect of house and street cleansing, ventilation, and imperfect supplies of water, contribute to produce atmospheric impurities, which affect the general health and physical condition of the people, generating acute, chronic, and ultimately organic disease, especially scrofulous affections, and consumption, in addition to the fevers, and other forms of disease, to which public attention has been directed by previous sanatory inquiries." Let us follow a few of these, and other eminent witnesses, in their testimony, and endeavour to extract from it so much only as merely bears upon the condition of the inhabitants of ill-placed and badly-constructed country cottages. Let us, to this end, commence at the foundation—first, then, as to the choice of a site.

In fixing upon the *site* of a cottage, there are several things to be regarded which are too rarely remembered. The first material consideration is the soil. For this purpose, if attainable, a gravel, or a sand, or loam are the best, because the driest and most easily drained. They may be regarded, therefore, as the most healthy. The next to be preferred is chalk, and then clay; both these are open to the objection, that a supply of water is commonly expensive on these strata; the water being only, in general, procurable at a considerable depth; but this is, in reality, very readily obviated, in even the worst cases, by a careful collection of the rain-water, and by providing a capacious water-tight tank, for storing it—of this I shall hereafter have occasion to enter more into details.

The *elevation* of the cottage above the level of the adjacent streams should be as considerable as can, with convenience and a fair regard to the interest of the owner, be accomplished. By an attention to this point, the air around the cottage is better, since it is further removed from fogs and malaria, which are apt to haunt low, lying, *ill-drained* districts; the breezes are more beneficially felt; the sewage of the house is drained off with more facility; the light is better; the prospect is, as the labourers are wont to describe it, "more cheerly." Now all these circumstances have a far greater influence upon the bodily and mental health of the inhabitants than is commonly believed or even suspected. Even merely dark, gloomy situations have been found by the medical profession to be prejudicial to health.

"During a practice of 30 years in a densely populated neighbourhood," said Mr. N. B. Ward (*report, p.* 41), "my attention has been repeatedly drawn to the influence of light, not only as a most efficient means of preventing disease, but likewise as tending materially to render disease milder where it occurs, and more amenable to medical and other treatment. Dupuytren (I think) relates the case of a lady whose maladies had baffled the skill of the most eminent practitioners. The lady resided in a dark room (into which the sun never shone) in one of the narrow streets of Paris. After a careful examination, Dupuytren was led to refer her complaints to the absence of light, and recommended her removal to a more cheerful situation. This change was followed by the most beneficial results —all her complaints vanished. Sir James Wylie has given a remarkable instance of the influence of light. He states that the cases of disease on the dark side of an extensive barrack, at St. Petersburg, have been uniformly, for many years, in the proportion of three to one to those on the side exposed to a strong light. The experiments of Dr. Edwards are conclusive. He has shewn that if tadpoles are nourished with proper food, and exposed to the constantly renewed contact of water (so that their beneficial influence may be maintained), but are entirely deprived of light, their growth continues, but their metamorphosis into the condition of air-breathing animals is arrested, and they remain in the form of large tadpoles. Dr. Edwards also observes that persons who live in caves and cellars, or in very dark and narrow streets, are apt to produce deformed children, and that men who work in mines are liable to disease and deformity beyond what the simple closeness of the air would be likely to produce."

The *aspect* of the cottage is a very material consideration. If it can be obtained, a southerly or westerly slope is decidedly the best. The warmth is greater of such a position; the most balmy breezes fall upon the full front of the cottage. The windows and doors being placed upon the same warmer side of the dwelling, admit directly only the warmest and the best air, and in consequence the dwelling room is kept sufficiently comfortable with a less expenditure of fuel. All these objects too are materially aided by placing the cottage under the shelter of higher ground, which keeps off the full force of the northerly and easterly winds.

These considerations, however disregarded in the construction of our own dwellings, or those of our labourers, we, inconsistently enough, are careful to remember in the erection of our farm buildings, and the sheds which border our farm yards. Even in the erection of styes, the proprietors of the large herds of swine have now generally found out that it *materially* conduces to the health and profitable management of these animals to place the styes in a warm, well sheltered locality, and with the stye-yard and door opening to the *southward.*

The cottage should be placed, as the late Mr. Loudon truly remarked (*Chadwick's rep., p.* 396), alongside a public road, as being more cheerful than a solitary situation, and in order that the cottager may enjoy the applause of the public when he has his garden in good order.

It is in vain that the owner of the cottage directs his attention to any of the internal comforts of the house, or to the garden with which it should be accompanied, if he places it in an unhealthy, wet situation, surrounded by stagnant ponds or ditches—places where, at particular seasons of the year, sulphuretted and carburetted hydrogen gases are copiously generated and emitted, and in whose neighbourhood, as a certain consequence, typhus fever and other diseases are pretty certain to be rife. All these facts were some time since brought before the public, in the able report of Mr. Chadwick on the sanatory condition of the poor—a work which I beg most earnestly to recommend to the general and careful study of every landowner and every tenant. In this valuable work he produces a large body of evidence upon this head. It is hardly necessary to quote much of this unanswerable testimony in support of the fact that wherever stagnant, impure waters are found, there disease in varying forms is certain to haunt those who live in their immediate neighbourhood.

"After twenty-six years' practice in this neighbourhood," observes Mr. D. R. M'Nab, the medical officer of the Epping union, "I may venture to add the following observation—that I have scarcely ever had a case of typhus fever in a malignant form, without discovering some stagnant drain or overcharged cess-pool, or some other manifest cause of malaria, in the immediate residence of the patient" (Report, p. 82).

Mr. Oldham, the medical officer of the Chesterfield union, observed (ibid, p. 87), when speaking of Wessington, most of the houses surround an undrained common full of pools of stagnant water, that "in the winter season they overflow, and in this season the neighbourhood appears less infected with fever. In the summer months, and greater part of the spring and autumn, they are stagnant, and undoubtedly a fruitful source of malaria; indeed, the neighbourhood of Wessington is scarcely ever free from fever at these seasons of the year. I am led to conclude that the decomposition constantly going on in these small pools is the source of the malaria, and that the malaria so engendered propagates fever."

"The malaria arises," adds Mr. Blick, the medical officer of the Bicester union, "from the decomposition of vegetable matter left upon Otmoor (a marsh of about 4,000 acres) by the previous winter's flood, and acted upon by the sun during the summer."

And at Leighton Buzzard another surgeon, Mr. J. Holt, observes (ibid, p. 88), "The great prevalence of these fevers in hot summers is principally attributable to the number of stagnant ponds and ditches which are situated in the very midst of many of the towns and villages of this union, and which in hot weather become quite putrid and offensive from the quantity of decaying animal and vegetable matter. I have generally observed that the greater number of these fevers occur in houses situated in the immediate vicinity of these ponds, and have no doubt that they are the chief cause of nearly all the fevers of this description."

"The sanatory effect of road-cleaning," continues Mr. Chadwick (ibid, p. 88), "to which house drainage and road drainage are auxiliary, it appears is not confined to the streets in towns and the roads in villages, but extends over the roads at a distance from habitations, on which there is traffic." Dr. Harrison, whose testimony has been cited on the subject of the analogy of the diseases of animals to those which affect the human constitution, in treating of the prevention of fever or the rot amongst sheep, warns the shepherd that if, after providing drained pasture, and avoiding "rotting places" in the fields, all his care may be frustrated if he do not avoid with equal care leading the sheep over wet and miry roads, with stagnant ditches, which are as pernicious as the places in the fields designated as "rotting places." He is solicitous to impress the fact, that the rot—that is, the typhus fever—has been contracted in ten minutes; that sheep can at "any time be tainted in a quarter of an hour, while the land retains its moisture, and the weather is hot and sultry." Such instances of the prejudicial effects of undrained and neglected roads might be easily multiplied.

Mr. E. P. Turner, the medical officer of Foleshill union, in accounting for some cases of fever, states, "These cases of typhus all occurred in the same neighbourhood, where the road is bad, and a dirty ditch of stagnant water on each side of it; the road is generally overflowed in the winter. The disease broke out in the month of October; other cases occurred in the same neighbourhood at the time."

If any evidence was required of the sanatory influence of good drainage, the removal of stagnant waters from a district, let the inhabitants of the now better-drained fens of Lincolnshire and Cambridgeshire attest; or if the experience of the tenants of a less extensive district is preferred, then I commend to the reader's notice the following observations of Mr. George Elgar, one of the medical officers of the Eastry union :—

"The parishes forming the fifth district of the Eastry union are, with one or two exceptions, close to marshes separating the Isle of Thanet from this portion of East Kent; and consequently, during the spring and autumn, the inhabitants are exposed to the malaria therefrom; but for these last few years, *owing to the excellent plan of draining,* very few diseases have occurred (in my opinion) that can be said to be produced by malaria. There is very little ague, scarcely any continued fever; and a case of typhus, I believe, has not been known along the borders of the marshes for these last three or four years. Some years back a great portion of the parishes adjoining these marshes was under water from the end of autumn to the early part of the following spring: then agues and fevers of all characters prevailed to a very great extent. Although the malaria does not produce diseases of any *decided character,* yet during a wet spring or autumn there are always cases of inflammation of the lungs or bowels, or rheumatism, both in acute and chronic forms. The houses in general are good, well drained, and ventilated, having one or two sitting-rooms, as many bed-rooms, sometimes more, scullery, &c., and convenient receptacles for refuse and fuel. The cottages generally are *extremely cleanly.*"

In the course of inquiries as to what have been the effects of land drainage upon health, one frequent piece of information received has been that the rural population had not observed the effects on their own health, but they had marked the effects of drainage on the health and improvement of the stock. Thus the less frequent losses of stock from epidemics are beginning to be perceived as accompanying the benefits of drainage, in addition to those of increased vegetable production.

(To be continued.)

BOTLEY AND SOUTH HANTS FARMERS' CLUB.

SECOND ANNUAL REPORT.

The subjects which have engaged the attention of those members who have attended the meetings of the last session have related to matters of the greatest importance to every one engaged in the cultivation of the soil. Much useful and practical information has been afforded and received. Indeed, your committee hold it to be quite impossible that a dozen individuals can meet and discuss any subject which has engaged their common attention without eliciting from each other information valuable to all. To accomplish this requires no remarkable talents, no rhetorical powers, no specious ingenuity, but simply and solely the exercise of that sound common sense and plain understanding which is possessed, with very few exceptions, by British farmers. Many of the disadvantages—many of the favourable opportunities which have been lost—many of the heavy blows that have been received—have arisen from the want of combination amongst agriculturists—a fact, in a great measure, due to their isolated position. It is by combination and discussion that those interests erroneously fancied to be opposed to that of agriculture have so frequently triumphed ; and it is only by union and discussion that the false position in which farmers are placed can be altered and improved. It is neither the business nor the wish of your committee to engage in, or provoke, political discussion ; but it cannot forbear alluding to a subject which has so largely occupied the attention of the councils of our country during the past session. Whatever may be the ultimate effect of the removal of those restrictions relating to the importation of foreign corn, it will not do for the farmer to stand still, with folded arms, and await, with placid indifference, the issue or the chance of circumstances, or (to borrow an illustration from another element) because the tempest threatens, or breakers are ahead, or even a leak has been sprung, to abandon to the fury of the storm the good ship in which all his hopes and possessions are embarked: he must seize the helm; he must study the compass; he must weather the gale, and all will yet be well. Though British agriculture might have received "a heavy blow, and a great discourgement," it is not utterly cast down. An art which involves the production of food for millions of our fellow creatures must be composed of materials too elastic to be more than temporarily discomfited by the effect of legislation. To meet his difficulties, however, the farmer must not wrap himself up in the cloak of solitude, or the garment of exclusiveness. He must seize with avidity (at the same time examining with caution and vigilance) every assistance afforded by science, or tendered by mechanical ingenuity; but, above all, he should acquaint himself with all the improvements that skilful practice has established on other farms and in other districts. How various are the systems adopted in different counties, and how superior are the practices of one over those of another we have ample evidence to testify: indeed, the experience of your own club can shew how diverse are the methods practised even in the same district. The various systems adopted in other counties may be readily acquired by a perusal of the works contained in your valuable library; but the practices of our own district can be best acquired by meeting your brother farmer, in the social converse of a farmers' club, where every practice and every idea having relation to the culture of the soil can be tested by dispassionate argument, rigorous examination, and careful inquiry. By thus comparing notes and "rubbing minds together" the spark of true knowledge may be elicited, the experiments of one may serve as information for others, the failure of the individual become a beacon for the many, and the sacrifices of a few establish directing posts for the multitude.

Your own information will, doubtless, supply you with numerous instances in which much money has been spent in unsuccessful experiments; the same trials having been repeated with the same results, in different parts of the country. Now, let us suppose that such an experiment has been thus repeated only twenty times, with an outlay of the small sum of £20 each, here is an aggregate expenditure of £400, entailing an absolute loss of £380 to the farming community, as all the wisdom and information afforded by them could as readily have been acquired by a single experiment at the cost of £20, provided such opportunity were obtained for the diffusion of such knowledge as is now freely afforded by means of farmers' clubs.

This is only one of a number of instances that could be adduced to show the evils that have arisen from the absence of combination, and the beneficial results that may follow union and co-operation. It is only by such means, *i. e.*, by every fact or discovery being made the stepping-stone to further facts and discoveries, that other sciences have advanced. This gradual and progressive accumulation of important truths may be compared to the laborious, but certain, ascension of a traveller towards a lofty and distant goal, which promises a reward for his labours; whilst the isolated and barren efforts of individuals, who confine their experience to themselves, may be likened to a horse in a water-wheel; or rather, in the language of Hudibras—

> "Like as a dog who turns the spit,
> Bestirs himself, and moves his feet
> To climb the wheel; but all in vain,
> His own weight brings him down again."

Your committee feel that it is unnecessary to offer any further observations on the importance of the subject of their labours; but, in concluding these preliminary remarks, they look forward with sanguine expectation to receiving from the members generally that cordial co-operation and support on which the health and well-being of all societies must eventually depend.

PROCEEDINGS OF THE CLUB.

The first meeting of the club, for the year 1845, was held on Monday, October 13th, 1845, Mr. Joseph Blundell in the chair.

The CHAIRMAN called on Mr. Thomas Twynam to proceed with the subject for discussion, viz.—"On the best method of draining land, as applicable to the mixed soils of this county."

Mr. TWYNAM'S observations tended to show that four methods of draining had been practised in this part of the country. Alder, or bushes, appear to have been the first materials used in draining land; indeed, some of the writers in the "Farmer's Magazine" attempt to prove the practice to be more than 100 years old; and it is still very generally adopted in the strong clay lands of Norfolk and Suffolk. Mr. R. Baker, in his prize essay in the "Journal of the Royal Agricultural Society of England," gives a very good account of it, preferring alder to bushes, and showing the cost per rod to be 4d. to 5d., or about £2 4s. 8d. per acre. But as few alder drains will stand more than six or seven years, such a method for thorough-draining land cannot be for a moment recommended; although, if some tiles, or good stones were laid in the main drains, very considerable advantage might accrue from it, when better materials cannot be had.

Stones appear to have been next resorted to as a means of draining land, and when they can be obtained within short distances, appear to answer well, more particularly when roots of trees or hedge-rows are to be passed, as we often find tiles, or almost every other material, closed by the root entering or filling up the drain. A very good account of stone-draining will be found in the "Farmer's Magazine," reported by the steward of the Hon. Henry Clive, wherein he states the expense to be from £3 to £5 10s. per acre, varying according to the distance of carriage of stone. The expense may be fairly calculated to be at least 10d. per rod when stones are on the land, and they ought to be of considerable size to answer the purpose well; 110 to 120 rods per acre will do.

Mr. TWYNAM next presented a model of what is termed a Wedge Turf Drain, which owes its origin, in this part of the country, to Mr. Charles Osborn, of Fareham. This plan he had himself found to answer a very good purpose upon strong clay pasture lands, having drained a pasture of about twelve acres on Stoke Park Farm, fourteen years ago, and which is now as perfectly dry as when first done. The plan adopted was first to lay in a main drain of large tiles, heading all the arms or branches with it by cutting the turf wedge shape, and well ramming with heavy rams, taking care to place one or two tiles at the end of every branch, to empty itself fairly into the main drain, which, being placed so as to give a quick draught, carries off all the settlement from the branches. Particular care should be taken not to place the arms so as to give too quick a run; for, should any part of the soil be sandy, or less tenacious than the rest, it will cause a washing of the soil, which will collect at the mouth of the drain, and destroy it. The cost of this description of drain would be about 55s. or £3 per acre, say at one rod distance—

160 at 4d. per score	1	12	0
Say 20 rods of tiles at 1s..............	1	0	0
Carriage of materials and expenses	0	5	0
	£2	17	0

This method can be practised with little advantage on arable land, although it is sometimes resorted to on very strong clays, as a very fair wedge can there be formed.

The last method of draining we shall have to consider is that of tile-draining, the greatest improvement that has ever taken place in strong clay farming. Many plans are laid down as best to be adopted; but from all we can see and read, it is hard to determine which really is the best upon level land, where it is difficult to find which way the water will draw. It can be of little consequence whether the drains are put in the furrows, or cross ways; but when the lands are uneven and sloping, Mr. Twynam considered it by far the best method to put the drains across the furrows, and to place each drain on ascending the hill side, that the top of the first drain should be just above the bottom of the second, and so proceed until the top of the field is reached. Professor Johnston, in his address to the Durham Agricultural Society, has given a similar opinion, as well as with respect to the depth at which drains ought to be placed in strong land, which he considered should be thirty inches.

This plan is now much questioned by Mr. Parkes and others, who contend that drains can be advantageously placed at a depth of three feet or more, and thereby require a less number of drains; this, however must depend much upon the soil to be acted on, and would little suit the great proportion of lands in this neighbourhood, where the practice now more generally adopted is to place the drains at one rod apart on very strong lands, varying a little according to the subsoil. Experience has shown that when drains are placed at too great a distance, water will sometimes run over, and the land not get sufficiently dry. The expense of draining an acre of land can be best ascertained by reference to a table published by the Marquis of Tweeddale, in his "Essay on Draining," wherein he gives the relative expense of draining an acre of land, varying according to depth and distance. An acre of land drained at one rod apart, thirty inches deep, with tiles fifteen inches long, will cost £7 7s. 9d.; but if you save half a rod, and put them at one-and-a-half rod, it will only cost £4 12s. 4d.; thereby showing the great advantage of increased distance where practice and experience has shewn the land can be thoroughly drained by so doing. With these observations Mr. Twynam came to the following resolution:—

"That the best method of draining lands in this neighbourhood is with tiles and soles, the drains being put across the furrows at (in very strong clay subsoils) not more than one rod or eighteen feet from each other, and not more than thirty inches deep: but when the subsoil is more open and porous, we consider one-and-a-half rods from each other will effectually drain the land."

The Chairman said that at a former period he should have supported the proposition of Mr. Thomas Twynam, as he did at that time entertain precisely the same opinions upon the subject as those which Mr. Twynam had just now advanced; and although he had laid down a great extent of draining upon different farms, upon heavy soils, at the depth and distance between the drains recommended in Mr. Twynam's proposition, yet within these few years he had altered his opinion very materially as to the propriety of shallow draining in strong and level land, and had taken up a number of drains and laid them deeper, in some cases to the depth of four feet, with a beneficial result in every case. He (the Chairman) would invite Mr. Twynam to alter his proposition, and substitute the depth of forty inches for thirty, with a corresponding greater distance between the drains, which should be placed in the furrows at right angles with the main drain. He would state his reason for recommending Mr. Twynam to alter his proposition. It would be found that in draining strong land increased fertility would result from the removal of water to a greater depth below the surface. It has been stated that water will not readily find its way in strong clay to the depth of forty inches. Now this may be true in clay land undrained, but after deep drainage capillary attraction is diminished, and the clay thereby so altered as to allow water to percolate freely to the drains; independent of this, the deep drain produces a greater body of absorbent earth capable of receiving a greater quantity of rain before any is given off to the drain. To prove the correctness of these views of the subject, let a hole four feet in depth be dug in a field drained at four feet deep, midway between the drains, and the water will be found standing at about three feet below the surface. The Chairman, in conclusion, said that whilst he believed that draining could be best carried out by the landlord advancing the requisite capital, and charging the tenant an interest on the outlay, or otherwise by each furnishing a moiety, on which no interest should be charged, yet, when circumstances precluded these arrangements, he would endeavour to shew them that they all had the means of drainage to a certain extent. Farmers had often told him that they could not afford, as tenants, to drain land. He would ask them, "Can they afford to buy manure?" the answer was, "Yes, we can." Then he would say they can afford to drain, because it can be proved that land can be drained at the same cost per acre as it can be manured for a course of four crops; and he would further say that draining without manuring would make the land more productive than would manuring without the draining during the four crops, independent of the draining being a permanent improvement, and the manuring a limited one.

The meeting was afterwards addressed by Mr. J. Warner, Mr. C. Gater, and others on the subject. Mr. Twynam's proposition was carried.

At a meeting held on Monday, Nov. 10, Mr. Joseph Blundell in the chair, the subject proposed for discussion was by Mr. Wm. Gater—"On the most economical mode of keeping farm horses."

Mr. Gater commenced his observations by stating the practice in many parts of the country of a greater variety of food being given to horses, and the good results proceeding from it, particularly as regards Swedish turnips. He proposed that the food during the different seasons should consist of the following provender, commencing Sept. 29—

		£	s.	d.
13 weeks—on	1½ bush. of bruised oats	0	5	3
,,	2 pecks of bruised beans	0	2	7
,,	1½ cwt. of hay..	0	6	0
		0	13	10
13 weeks—on	2½ bush. of pollard	0	2	1½
,,	2 pecks of bruised beans	0	2	7
,,	Straw	0	1	9
,,	70 lbs. of turnips	0	0	8
		0	7	1½
13 weeks—on	2½ bush. of pollard	0	2	1½
,,	2 pecks of bruised beans	0	2	7
,,	1½ cwt. of hay	0	6	0
		0	10	8½
13 weeks—on	2 bush. of bran........	0	2	0
,,	1 peck of beans	0	1	3
,,	Cut clover, tares, & pasture	0	3	6
		0	6	9

Mr. Twynam, after a few remarks on Mr. Gater's resolution, proposed the following kind of food, as an amendment, commencing in the autumn:—

13 weeks—on	1½ bush. of oats	£0	5	3
,,	1 peck of beans	0	1	3
,,	1 cwt. of hay..........	0	4	0
		0	10	6
13 weeks—on	2 bush. of oats........	0	7	0
,,	1 peck of beans........	0	1	3
,,	1 cwt. of hay..........	0	4	0
		0	12	3
13 weeks—on	1 bush. of oats........	0	3	6
,,	3 rods of clover, vetches, &c	0	3	0
		0	6	6
13 weeks—on	1 bush. of oats	0	3	6
,,	2½ rods of clover	0	2	6
		0	6	0

After many other gentlemen had spoken, Mr. Twynam's amendment was carried by a majority of the members present.

At a meeting of the club, held on Monday, Dec. 10, 1845,

The Chairman, in proceeding to the business of the day, observed that it was to be regretted that Mr. Ekless, the proposer of the subject for discussion for this day, was absent, having recently lost a relative; but he had received a letter from him, excusing himself, and likewise containing very extensive and varied information upon the subject of the potato disease, which was well received by the members present. Various opinions were expressed as to the cause of the disease; but the general impression was that it was to be ascribed to some hidden atmospheric influence, as mysterious as the cause of many epidemic diseases amongst man and animals.

Mr. Spooner, after stating the opinions of chemists, and what he considered the nature of the disease, recommended, with a view of staying its progress, that the potatoes should be packed in powdered charcoal, which possessed the advantage of being at once a powerful antiseptic and a great absorber of moisture, and would consequently readily absorb the moisture which was elicited in an unusual degree from the diseased roots, and which otherwise served to augment greatly the progress of decay. In the absence of charcoal, peat or turf ashes might be employed, though with less advantage; and any of these substances had the recommendation of being afterwards available as manure.

After a long and interesting discussion, in which a variety of opinions were expressed, no distinct resolution on the subject was arrived at.

At a meeting of the club, held on Monday, Jan. 5, 1846, Mr. Blundell in the chair,

The **Chairman** called on Mr. G. H. Appleby to proceed with the subject for discussion, viz.—"On the best method of cultivating strong clay soils, with a view of supporting the greatest quantity of sheep, and growing the most corn, at the least expense."

Upon a strong, poor, wet, clay land, supposed to consist of 200 acres of arable land, and from 10 to 20 acres of pasture land, the following conditions should be adopted:—The lease should be granted for not less than 14 or 16 years; landlord should do all the underground draining, tenant paying £4 per cent. for landlord's outlay, or landlord find tiles, and tenant labour; tenant should be recommended to chalk, but not obliged to do so; tenant should be paid at the end of his term for all permanent improvements, and for half the value of the bone manure, or other artificial manure of the same quality, used in the farm during the last two years, and also one-sixth part of the value of all linseed cake or corn given to sheep throughout the last two years.

The tenant should be recommended to adopt the following system of cultivation, or as near to it as circumstances and the seasons will admit:—

TURNIP AND GREEN CROP.

	Acres.
Swedes after wheat; to be only once ploughed if the land be tolerably clean; the Swedes to be fed off late in the next spring..........	15
Common turnips after wheat.—If the turnips are a good crop, half of every alternate ridge may be pulled up and carried into a ley field, for feed in wet weather; and some may be carried to a yard for the fattest sheep, previous to being taken to market........	15
Early turnips 10 acres, and 5 acres may be rape after Swedes; half of the turnips should be carried into a ley field, and some into a yard, for the same purposes as the other common turnips	15
Tares, 15 acres winter, and 5 acres summer.—Tares to be fed off by sheep not later than the end of July. Land ploughed up as fast as fed off, and all ploughed three times. A light coat of dung should be put on before the last ploughing, which should be completed in ridges for sowing by the end of September, so that the wheat may be put into the land in two or three days, about the 20th of October	20
	65

WHEAT CROP.

After tares, as stated above	20
After rape and early turnips, which should be all finished feeding, and the land sown with wheat by the first week in November......	15
After hay cut (clover) or grass fed, to be well dunged, and ploughed only once, and sown in October..........................	15
	50

SPRING CORN.

Barley or oats after wheat, to be sown with grass seeds, clover once in eight years	20
After common turnips, and sown with oats and grass seeds, as before directed	15
Oats after ley, where the turnips fed in wet weather; or part of this may be sown with beans or peas if required................	15
	50

The foregoing system will give 35 acres of clover, or other grass, for hay, or part may be fed; and the 15 acres of oats after ley should be sown with winter tares; and, as 20 acres will be ley every winter, it will afford 15 acres for oats and 5 acres for summer tares. The turnips should be all drilled 24 or 27 inches wide, with bones mixed with as many ashes as possible, or road scrapings, or fine earth, from 30 to 40 bush. per acre. The turnips being properly set out, the horse-hoe may be advantageously used between the drills, two or three times during the summer, in dry weather, which will be equal to a fallow. This system will enable the tenant to fatten from 400 to 500 sheep annually, or improve that number to the amount of £200 to £250 per annum, and at the same time grow more corn than under the old system of fallow, which rendered it necessary to plough four or five times during the summer, and by which very few sheep, if any, could be kept.

Mr. **Blundell** proposed that the following rotation of crops would be preferable to that proposed by Mr. Appleby, upon the better description of clay and clay loam soils:—

1st year. Wheat, one-third sown with clover.
2nd year. One-third clover, mowed for hay; one-third beans, oats, peas, or vetches; one-third Swedes, rye, or winter barley. Vetches are usually sown on a portion of the Swede field.
3rd year. One-third clover-fed, summer-tilled, or sown to green crop; one-third early turnips, or

rape; one-third rape or summer vetches or some prefer a clean fallow.

After many remarks among the members present, it was considered that both Mr. Appleby and Mr. Blundell's rotation of cropping were in every way applicable to the different variety of soils alluded to in each proposition.

At a meeting held on Monday, Feb. 2, 1846, Mr. Blundell in the chair,

The CHAIRMAN called on Mr. Spooner to proceed with the subject named for discussion—"The use of superphosphate of lime as a manure for the turnip crop."

Mr. SPOONER, after treating of the composition of bones as proved by analysis, and pointing out that it was principally the earthy portion of bones that rendered them so valuable as manure for turnips, proceeded to explain the chemical changes effected by the agency of sulphuric acid, the principal of which was to convert the phosphate of lime, which was difficult of solution, into a superphosphate, which was readily soluble and possessed a double proportion of phosphoric acid. After relating the other chemical changes effected, he proceeded to state the proportions of acid and of water most desirable to employ, supporting his opinion both by theoretical reasoning as well as by the result of practice. He afterwards narrated a number of instances in which the manure, manufactured by himself, had been tried by various agriculturists, and with almost unexceptionable success; the experimenters, in many cases, being members of the club. He also related various experiments instituted by himself, and amongst others one of the continued good effect of an experiment which he brought before the club during the last year, in which two bushels of the superphosphate had successfully rivalled sixteen bushels of bone dust in the growth of Swedish turnips. He was now enabled to state that the crops of oats which succeeded, was, to say the least, as good where the superphosphate of lime had been employed, and the promise of the clover crop was also equally favourable.

He finished his subject by calling the attention of the club to the following conclusions, which he considered they might justly deduce—

"That superphosphate of lime is the essential manure for turnips, and particularly for Swedes. That with it alone a good crop can be raised; but without it the turnip will not thrive, however rich the manure may otherwise be.

"That vitriolized bones may be used either alone or with other manures, and that when the latter are at hand, it is more advantageous to use the former in combination with them. For instance, if there are 30 acres to be prepared, and only sufficient dung to dress 15 acres, it is better to give a half-dressing of dung over the whole of the turnip break, and make up the deficiency by means of sulphated bones. Thus the plant will be forced in its early, and supported in its later growth. For the same reason vitriolized bones may be advantageously combined with guano.

"That vitriolized bones are equally advantageous to the second year's crop, when the turnips are either wholly or partially fed off with the sheep.

"That while the economy of this manure is thus proved by practice, it can be as readily explained by theory, *e. g.*:—The tops of Swedes are known to possess double the phosphoric acid contained in the bulbs. Thus, the superphosphate of lime in the manure causes the rapid development of the leaves—one of its peculiar properties. The leaves being thus early and largely developed, are enabled to extract a considerable portion of nourishment from the atmosphere, much more indeed than where the leaves are small and backward. The difference between the amount of food derived from the atmosphere by a forward and flourishing crop, and that obtained by a backward and dwarfish crop, is so much absolute gain to the farmer, or rather to the land. It costs nothing on the one hand, but yields considerably to the land if the crop is fed off on the other. A manure that would thus force on the turnip in the early stages of its growth, was long felt to be a desideratum by agriculturists. This want has now been supplied, and even if this were the only recommendation sulphated bones possessed, its discovery and introduction would still be a boon.

"The value of vitriolized bone may now be considered to be fully and fairly established. Its claims rest not on the assertions of a few experimenters. It has been tried during the last season by hundreds with success, and in the next will be tried by thousands."

An interesting discussion afterwards ensued, though not of a controversial character, in which Mr. Spooner was asked for additional explanation on various points of his subject, and in which several members expressed their intention of trying the manure during the approaching season.

At a meeting held on Monday, March 16, 1846, the subject "Tenants' Rights," it was resolved to adjourn the meeting to April 13, when the subject of "tenants' rights" would be discussed by Wm. Warner.

(Signed) J. BLUNDELL, Chairman.

The cause of adjournment of this meeting arose from an unavoidable misunderstanding as to the precise day for the discussion of the above subject.

At the adjourned meeting, held April 13, 1846, in consequence of there not being a sufficient number of members to form a meeting, and finding that the various occupations of the members, at this season, interfered seriously with their attendance at the club, it was resolved that future meetings should close a month earlier, viz., in the month of March.

WM. WARNER, Secretary.

VINES ON EXTERNAL WALLS.

BY J. TOWERS, MEMB. R. A. S., H. S. OF LONDON, &c., &c.

Nature and the seasons have favoured us with proofs decisive of what vines can produce under auspicious conditions. The sorts I have cultivated during the course of sixteen years, on the same sites, have afforded me comparative proofs of the capabilities of these trees. In 1835 (that summer of magnificent splendour, but chastened by a more healthy intermediation of genial moisture than those of 1844 and 1846) I had a crop of fruit so fine that—in addition to a sufficient quantity of green grapes for wine—the heavy clusters ripened well in August and September, and some were retained in prime condition for the table till nearly Christmas; but, capital as was that crop, it was far inferior to the one of the present year. The abundant *rains of April* and May, the *then absence* of our too usual *spring frosts*, followed by the perfect summer as to *sun* and *heat*, which continued from May 22nd to September 21st, caused not only the earliest development of the fruitful shoots, but maintained an uninterrupted progress till at length the berries swelled to the size of protected fruit, and possessed a flavour far superior to any so grown that I have tasted, at home or elsewhere. Under these circumstances I think it a duty to state the capabilities of vines, so far as I am instructed by my own experience, in the hope that many may be thereby led to avail themselves of circumstances which they have at command, but know not how to render available.

There are four vines which bear the open ground well, if planted against a south-east or south wall: the higher the better. These are, 1st, the best *sweetwater*. Of this grape there are three notable varieties—the Dutch, the Jerusalem, and the one called Stilward's; the last, perhaps, is better under glass. The berries are round, and, if finely grown and carefully thinned *in order*, when about the size of a good pea, they swell to a full size. I planted mine in the autumn of 1830, in good garden loam, without any care as to prepared border, and have subsequently manured the surface or dug in the fallen leaves. A single strong rod was at first purchased of a nurseryman, being cut down to two or three buds early next year: one was carried upright, to run by the side of a doorway; another was trained near the surface, laterally—this sent out, yearly, upright rods, and these have been renewed yearly, and trained two feet or a yard apart, upright; and this has been my simple system, by which means, for twelve years or more, I have had a wall covered with bearing wood to the height of sixteen feet.

2nd. The next to be named is the *true muscadine*, a sweet and delicious fruit, which when duly matured has a buff yellow tinge, spotted with russet red upon the sunward side. Many persons force this grape; but never in any house did I take fruit with the full, exquisite flavour, ripened on my south-east exposure by the late surprising summer. The mode of training and pruning, to have new bearing rods every year, is the same as that for any other *white* grape. I do not mean to infer that the spur on older wood will not suit these grapes; but it is presumed that the "system of spurring" is more suitable to the red or black varieties, and the fresh long-rod system to those with white fruit.

3rd, the *claret*, or blood-red grape. This is a slender and rather short grower. Its fruit is round, small, thick-set in closely-packed clusters. The juice is of an intense purple red, and confers a durable stain on the skin. It is only fit for the vintage, being sour and austere. The leaves are rather downy about the stalks, liable to curve or roll backward (revolute) at the edges, and when fully mature, in September and October, they assume a fine fresh red tint. If pulled to pieces (not cut by an iron instrument), and infused in hot water, they give forth a rosy juice of the most beautiful hue. This tinted infusion, added to the expressed juice of the grape, aids the latter much in the preparation of a thoroughly good English claret wine—one which, though certainly not a "*vin de Bourdeaux*," is so excellent as to be greatly preferred to most domestic wines, both as respects flavour and its superb colour.

These three vines are amply sufficient for any garden. They ripen fairly every year, and have failed with me but once since they began to be fruitful. We have several varieties of black-fruited vines, namely, the Miller's Burgundy, black cluster, the *black muscadine*,* and the Esperione—the last the best; but there is no flavour in any of them, compared with the sweetwater and white muscadine; and as to a *red wine*, if the vintage be the object, none of the black varieties, save the claret, will confer any colour to the wine, because the juice of all of them is pale.

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* *Black muscadine*—Synonymous, I believe, with the celebrated "Chasselas," of Thomery, near Fontainbleau, of which we have so lively and pleasant a notice in "L'Illustration Journal Universel," Sept. 26, 1846.

If *wine* be made at home, recourse should always be had to *grapes*, otherwise a mere "British sweet," as it is called, will be the result, since the essentially specific acids of gooseberries, currants, raspberries, mulberries, and oranges are not the same as that of the grape. To produce a wine we require the bitartrate of patash, and in the juice of the vine we find it. Thus it exists in the immature fruit—as M'Culloch proved in his "Treatise on Wine-making"—to greater perfection than in the fruit so ripened as it usually is in our climate. This fact proves one of the greatest recommendations to the open-air culture of the tree in England. If, therefore, a family wishes to prepare home-made wine, white and red, it ought to possess itself of the varieties in question; for ample experience, to say nothing of written authorities, affords proofs undeniable that from the green immature fruit of the white grapes, taken about August, a white wine of the purest flavour can be obtained, at a price so low as almost to compromise its respectability; and from the *claret leaves* and *ripe* berries a red wine of fine and pure flavour is equally at command.

I do not wish to dwell upon the vintage any farther than is required to demonstrate the capabilities of the tree in this uncertain climate, which assuredly is not warm enough to bring the fruit to anything like perfection, one year out of five at the least; but, as most favourable exceptions do occur, of which the year 1846 has furnished one example, I propose to offer a few observations on the progress of the vines throughout the late season. I observed the buds of all my vines to sensibly enlarge before the end of March; this advance continued through the showery period of April, and the buds then expanded. As no frosts occurred in May, the clusters became visible, and the hot weather of June brought them into blossom. Such a state of progress I never before witnessed; it therefore is not at all surprising that the fruit mellowed as it does in the north of France. The vice of grape-growing here—when ripe, eating fruit is the sole object—is the lateness of the season, on one hand, leaving the fruit green, herbaceous, and sappy in October; on the other, if, as it too often occurs, that a bland spring brings forward fine wood, a frost in May destroys the hopes of the year. In the season of 1846 the entire development progressed without one serious obstacle from March 25 to the middle of October: I say serious obstacle because, as May, June, and the first weeks of July were all that could be desired, the grapes swelled so as to be fit for thinning. Still, however, the wet and cold weeks of July and August retarded the maturation by one entire month.

As to *induced* earlier progress, that able writer, the late R. A. Salisbury, Esq., F.R.S., had a remarkable passage in a paper which appeared in "Loudon's Gardener's Magazine," vol. i. p. 43. A Scotch nobleman had visited a place belonging to Mr. Salisbury, and, noticing a vine which failed to ripen, observed—"When I was a young lad I remember eating ripe grapes from a vine in the open air, near Stirling Castle, which was brought to ripen half its crop in most summers, and a whole crop in warmer summers, by the following treatment. On the 29th of September prune the vine as you would in December, taking off all the leaves and grapes ripe or unripe, and shortening all the branches to one, two, or three eyes. Train it carefully all the summer, as if you were certain it would ripen a crop of fruit. Pursue the same system annually, pruning the tree always between the 20th and 30th of September, and in the course of seven years you will be rewarded for your patience and expense with half or a whole crop, according to the summer." From pursuing this treatment (the rationale of which consists in causing the lower buds to enlarge, by the check interposed by amputating the previously active green shoots) Mr. Salisbury assures us that, "five years afterwards, some excellent wine was made from the grapes."

HASTINGS AND ST. LEONARDS' MECHANICS' INSTITUTION.

The annual soiree of this Institution was held at the Assembly Room, on the 27th of October, under the presidency of J. H. Maw, Esq., the worshipful the Mayor of Hastings.

The opening address was delivered by the mayor, J. H. Maw, Esq., who said, having but recently been elected a member of the institution of which this meeting may be considered a sort of anniversary celebration, I shall not attempt to dilate upon any distinctive features in which it might, perhaps, be shewn to possess peculiar claims to public cooperation and support. I am desirous of merely pointing out or referring to a few facts, the due consideration of which may tend to shew the practical value of the results which may be expected from well conducted associations of the operative classes, when they thus unite for the purpose of mutual assistance in the pursuit of useful knowledge, particularly of that kind of knowledge which they may bring to bear on those various indispensable arts and manufactures, by the professional exercise of which they provide for the necessities or administer to the enjoyments of society. The requirements of the age in which we live are pre-eminently those of the practical kind; and experience proves that a knowledge of natural principles, and an acquaintance with systematic arrangements and classifications of facts, are never more profitably bestowed than on the operative mechanic, because they are never so immediately productive of practical results. It has been objected to institutions of this kind, that the principles of political economy recommend the policy of such an arrangement of society as, by means of division of labour, enables one class to be engaged in thinking whilst others are occupied in working. Be it so; but who shall arrange the classes? and who is he who will presume to point out, through the involved and obscuring veil of circumstances, the individual who has any prescriptive or rightful claim to a place in the class of thinkers, to the exclusion of this or that individual, to whom he is entitled to say—"once a labourer always a labourer"? Moreover, with all the deference due to those great authorities who have pointed out the numerous advantages resulting from a division of labour, I think this question, like most others, has two sides: that if this division and subdivision perfects and cheapens produce, it has on the other hand a direct tendency to deteriorate the mind of the producer, by converting the man into a machine (*applause*). The ladies are all judges of that most effective, though beautifully simple, machine, a pair of scissors—an invention so perfect as to have defied, from time immemorial, all attempts to improve it. Could they enter one of the manufactories at Sheffield, and stand for a while beside the anvil of a workman employed in forging scissors, they would be amazed at the perfection to which the mere mechanical part of human nature may be brought by continuous exercise, and by isolation, if I may be allowed the word. Observe that straight bar of steel which he takes from the fire; count exactly the number of the blows by which he so rapidly converts it into the half of a pair of scissors, ready for the hand of the filer—"so many;" now watch the next—"the same number of blows;" the next—exactly the same! and so on, and on, for hour after hour, without a single deviation from the machine-like accuracy of his monotonous labour. And all this numeric precision is not merely undesigned—the workman thus wonderfully perfect by practice, is probably unconscious of the remarkable proof of his own mechanical accomplishment; and this is *one* of the results of Division of Labour. But this man's occupation involves no necessity for thought, furnishes no material for reflection, and consequently affords no stimulus to the acquisition of knowledge; and these are the men who most commonly have recourse to stimulants of another kind, as a ready and effectual means of varying the dull monotony of their sensations, and this we may note as *another* result of the division of labour. Hastings is, however, not a manufacturing town, in the sense that Sheffield and Manchester and Birmingham are; still, wherever a population as large as ours exists, there must of necessity be a considerable body of skilled artificers, quite numerous enough to create a necessity for a Mechanics' Institute, and to confer importance upon it (*applause*). Moreover, the artizans of such a town as ours are, of necessity, more variously, if not so perfectly accomplished in the various arts in which they are engaged, than are those of the large manufacturing towns, because the comparatively limited sphere of our operations precludes, to any great extent, the division of labour, and compels the individual to acquire a greater variety of technical knowledge than would under other circumstances have been necessary. It may be further observed that this union of various technical knowledge and mechanical skill in the same individual, is usually connected with a corresponding aptness for the acquirement of a knowledge of general principles and systematic arrangements; and the multifarious nature of the demands made upon the ingenuity and skill of a Hastings mechanic constitutes no mean exercise for a considerable degree of talent. How little are the majority of those who send for the smith or the carpenter, and say, "do this," and "do that," aware of the nature of the task they are sometimes imposing not merely upon the handicraft of the artizan, but upon the intellectual powers of the individual. But the thing required, if just within the limits of possibility, is done—and there is an end, for we seldom hear of, or are made to comprehend, the nature of the difficulty surmounted. It is "all in the way of trade." The educational arrangements of the Hastings Mechanics' Institute include, in addition to frequent public lectures by members and others, a system of class instructions, in which are taught, during the winter months, several of the most useful branches of elementary knowledge; and I am happy to have it in my power to say that there are amongst us individuals, whose education has been entirely derived from this institution, highly appreciated and respected by their fellow-townsmen at large (*applause*). It is so obviously the interest of the operative classes in general, and of the skilled artizan in particular, to acquire a knowledge, not only of such strictly rudimental matters as reading, writing, and arithmetic, but also as far as possible of physical science, and the mechanical and chemical properties of the different substances which are employed in the arts and manufactures, that I trust we shall speedily receive numerous accessions from that class for whose especial benefit Mechanics' Institutes were originally intended. The present arrangements of our institution embrace much that is indispensable, much that is valuable, and, considering the somewhat mixed character of its constituency, scarcely anything which can be considered superfluous—certainly nothing which can be truly deemed useless in itself. I am, however, of opinion that one or two evenings of each week, during the winter season, might be set apart for well-conducted discussions on the principles of the most useful of the sciences, and I believe that very valuable results might be derived from such an employment of our time. Let us suppose, for instance, that chemical science is our object. If the section on electricity, in such a work as Graham's Elements of Chemistry, were appointed to be read by the chairman for the time being, and if it were expounded and discussed, to the best of the joint ability of those present, what a useful degree of knowledge might in a very short time be obtained of the great fundamental principles of chemistry!—a science on which is dependent the successful conduct of almost every process, art, or manufacture, that can be named, for it distinguishes and treats of the peculiar properties of every diversity of substance. If this proposal were to be adopted, I would suggest that each alternate discussion should assume a decidedly practical character. How very appropriately and usefully might we, for instance, test and confirm our previously obtained knowledge of electro-chemistry, by its most obvious practical application to the deposition of metals from their solution!—a process easily performed on the experimental scale with the simplest apparatus, one and which is not only very instructive, but of great commercial importance, from its rapidly extending application to innumerable branches of manufacture, from the gilding of the most minute trinkets to the coating of enormous tanks and vats (*applause*). It might, I trust, be reasonably expected that there are but few skilled workmen in metals who would not only imbibe some taste for science, but also obtain considerable useful information from such a discussion. Again, let us suppose that we have in like manner ascertained, to a certain extent, the character and properties of that pre-eminently active and important agent, oxygen, and of its relations to that other important substance, carbon; how usefully might the technical knowledge and practical experience of the artizan who builds our furnaces, sets our stoves, or arranges our gas-lighting apparatus, be brought to bear on a discussion of the action and mutual re-action of these two elements! I say usefully, for how greatly do the necessities of the poor and the comforts of all classes depend upon a scientific, that is, upon a judicious and economical arrangement of our domestic apparatus for the combustion of carbon, the great constituent of all our fuel! In such a climate as ours, and in a country where so much poverty unhappily exists, he who might suggest or elicit means whereby the present uncontrollable waste of one of the prime necessaries of life could be prevented, would deserve a better monument than has ever been raised to the most successful of warriors. And is not this great desideratum as likely to be supplied by the practical man—the working mechanic, who has acquainted himself with the chemical and mechanical properties of substances, with which he has day after day to contend—as by the theoretical philosopher, whose resources are of necessity chiefly derived from reading and reflection, with perhaps occasional essays in the way of experiment? There is also another class of substances which existing circumstances of a deplorable nature point out as demanding the most serious attention of the operative, and indeed of all classes of society. Any amount of time which can be spared, or of care which can be bestowed in rendering ourselves capable of ascertaining the relative nutritious properties, and consequent intrinsic value, of the various kinds of grain, roots, and other vegetable products of the earth, would be not only a profitable and praiseworthy employment, but a sanctified exercise of the intellect *(applause)*. Appetite for food is for a time appeased by almost any harmless digestible substance, but it is only in proportion as our food is capable of conversion into animal substance, that it is worthy of the name. That which it is the interest and duty of the working classes especially to ascertain with regard to vegetable food is not "how many pounds for 2d.?" but "what proportion of this root, or of this grain, is actually food; and to which ought I, as a rational being, desirous of acting on motives superior to the impulses of mere habit, to give the preference?" The power of answering such a question as this implies a certain extent of chemical knowledge, but no greater than might be obtained in a single season through the medium of our institute, were its members to give themselves to the work with that degree of earnest co-operation which its importance demands of them. So long as the potato plant continued to yield with a tolerable degree of regularity its seemingly profitable, because bulky and weighty crop, it was but labour in vain to contend with the force of blind habit, by attempting to prove that its tubers were, comparatively with grain and many leguminous seeds, an extremely innutritious, and consequently dear kind of food; but now that the hand of infinite wisdom is year after year blasting its produce in many widely separated lands, it may not, perhaps, be altogether unavailing to call in question the policy of continuing to cumber the ground with this delusive vegetable, and to encourage the poor to depend upon its watery and almost worthless tubers, as a staple article of food (*hear*). It would require no great expenditure of time to enable any commonly intelligent member of such an institution as ours to become sufficiently acquainted with the general distinctive properties of animal and vegetable substances—to know that the element called *azote* or *nitrogen* is, in an especial manner, a characteristic constituent of animal matter, and that its presence gives rise to that peculiar odour which is evolved when animal products are burnt, as in that very familiar domestic experiment by which ladies distinguish silk from cotton threads in textile fabrics of a suspicious character. There is, however, a product of the vegetable world also, into which nitrogen largely enters, and which, in consequence of its great similarity to the animal principle, formerly called *gluten*, has long usurped that name. This substance possesses in an eminent degree the qualities requisite for the nutrition of animals, whence the superior value of wheat, in which it is contained in a much larger proportion than in any other of the nutritive grains. A modification of gluten, called *albumeu*, exists also in the juices of various plants of the cruciform kind, or cabbage tribe, and in rice, barley, rye, peas, beans, and the seeds of all leguminous plants, most of which are, in consequence, found to possess a valuable degree of nutritive properties. There is also another vegetable substance, whose nutritive power, be it observed, is greatly inferior to that of gluten or albumen, although existing in the seeds of most plants. A consideration of the phenomena of vegetable life and growth strongly indicates that this substance is intended not so much for the food of man, as a pabulum for the embryo and nascent plant, which it supplies with necessary juices only until its infant organs have extended themselves sufficiently to derive independent nutriment from the soil. Chemists have named this substance *fecula*: those who are no chemists call it *starch*. The potato affords us an instance of one of those admirable arrangements in which creative wisdom is remarkably manifested, and which is, indeed, very analogous to that beautiful illustration which Paley has derived from the animal kingdom, of what he terms peculiar organizations, and which he commences thus:—"The stomach of the camel is well known to retain large quantities of water—and to retain it unchanged for a considereble length of time—a property which qualifies it for living in the desert." In like manner the potato is not only a plant "bearing seed after its kind," but its re-production is further secured by one of those "peculiar organizations" which constitute a safeguard against the effects of the extremes of drought to which its natural habit is liable. It is furnished with subterraneous gems or buds, whose absorbent vessels are imbedded in a juicy mass of organized matter, consisting chiefly of water, which supplies them amply with that moisture which the parched soil was incapable of affording either to them or to the seed which had perished upon its dried surface. This aqueous tuber contains also a provisional supply of starch, on which the tender plant feeds during its first stage of growth. But there is no gluten in these tubers, on which millions of those who ought to be the strongest, and therefore the best-fed class of mankind, contrive to keep life within them (*hear, and applause*). Lampadius obtained from one hundred parts, in different varieties of potato, from 12 to 18 of starch, from 5 to 8 of fibrous matter, and the remaining 70 to 75 parts water. The experiments of Dr. Pearson and others afford similar results. So that, in every pound of potatoes the poor man purchases, he actually pays for three-quarters of a pound of water—mere water (*hear*); and the remaining quarter of a pound is starch—probably of all vegetable food the least nutritious. This is one of the numerous instances of an important class of facts which it ought to be a main object of institutions for the propagation of useful knowledge amongst the operative classes to qualify their members to ascertain for themselves—for their own advantage—and for the benefit of society at large (*applause*). I am desirous of referring to an instance of another kind, which I think points very directly to the immediate value of systematic knowledge to the artizan. It occurs to me in consequence of a conversation I had only a few days ago with one of the most reflective of our operatives, who was about to commence some work for me. The nature of my proposed mode of procedure was so greatly in defiance of technical precedent that he very properly demurred to its adoption, until I had explained the principle by which I was actuated, and had referred him to a somewhat curious fact, which I found had often attracted his attention, but which was to him, as it is, I dare say, to most of his craft, perfectly inexplicable. The respectable individual to whom I take the liberty of alluding is a painter—not an artist-painter of pictures, but an every-day useful artizan-painter of doors and windows. I required him to put no white lead into the preliminary or "priming" coat, as it is technically called; but as the work was to be an invisible-green colour, approaching black, to use lamp-black at once—to begin with it, and to finish with it. He objected that there would be no "body" in the work. I asked him if he had ever observed the remarkable appearance presented by certain ancient notice-boards, inscribed with black letters on a white ground? He said, "Yes, I have, frequently; but I could never understand how it comes to pass that the black letters remain perfect, not only long after the surrounding white has perished and disappeared, but even until the surface of the board itself has mouldered away, actually leaving the black letters in bold relief" (*hear*). Now this mystery, unimportant, or even trivial, as it may appear to some, is one of many of a like kind, well worth clearing up. The knowledge would be valuable if it stood alone, but the workman who is acquainted with the principle on which it depends, holds the key to a whole class of innumerable secrets of equal or superior value (*applause*). A little knowledge, which parrots and other bipeds have been taught and habituated to call "a dangerous thing"—certainly no greater modicum of learning than is within the power of this institution to afford to any industrious mind—would have sufficiently informed this individual of the general properties of those substances which are characterized as simple, because hitherto undecomposed, and would have told him also of many of their most important relations to each other. Every house-painter knows that black paint is made of lamp-black; but not that lamp-black is nearly pure carbon, and that carbon is one of the most imperishable substances in nature—that it neither acts nor is acted upon by the vegetable oil in combination with which it is used as paint, and that consequently these two substances, the carbon and the oil, hold so well together, that the slightest film of the compound forms a most durable protection against the destructive influences of wind and weather (*hear, and applause*). But how comes it to pass that the strong-bodied white lead is so evanescent, that three, perhaps four, good coats of it are absolutely annihilated, whilst the single coat of lamp-black remains in nearly its original condition? If he will but take the trouble once to read over carefully the section on lead, in almost any good system of chemistry, he will learn that this metal exerts a powerful chemical action on oils, and that, in consequence of this property, oil, when in combination with lead, goes on hardening until it has lost all its tough and elastic qualities, so that at last the compound becomes brittle as glass; the board to which it is adherent, contracting and expanding with every vicissitude of the atmosphere, splits its surface of paint into innumerable fragments, moisture is admitted, and frost completes the work of destruction (*hear*). Now these are homely specimens of that kind of knowledge which appears to me to be peculiarly within the province of a Mechanics' Institute (*hear, and applause)*. And the instances I have adduced may be considered fair samples of an enormous class of useful results, naturally flowing from a cultivation of science immediately connected with the every-day employments or domestic requirements of the operative classes; and yet there are those who say that mechanics would be spoiled by making them, or encouraging them to render themselves, scientific—that is to say, by the acquirement of general principles, suggestive and explanatory of numberless facts of great practical utility, but which are only not generally known because they happen to lie a little below the mere surface of things (*applause*). Let it not, however, be supposed, because I have endeavoured to shew that utility is our great object and our chief aim, that we would proscribe or even neglect considerations and studies which have for their object a knowledge and understanding of the principles which govern what are honourably and appropriately designated the fine arts (*hear. hear*). On the contrary, I believe that the future success of England as a commercial country greatly depends upon the improvement and extension of artistic knowledge amongst her manufacturers and artizans (*hear, and applause*). We have long been, and still continue, lamentably inferior to our great rivals, the French and Germans —not indeed in the highest departments of fine art, but in those branches of it on which the decorative beauty and elegance of our manufactures depend. Indeed, that our manufacturers are unequal to the tasteful requirements of their own country, is painfully evinced by the display of French patterns in textile fabrics, and of the immense stocks of ornamental glass and German trinkets, and other decorative materials in the shops and warehouses of the metropolis. I fear that in this matter John Bull is somewhat short-sighted (*hear, hear*). He is as yet, perhaps, too exclusively utilitarian, fully to comprehend the commercial value of such metaphysical commodities as beauty and elegance. Schools of design are, however, now open, and opening, for this hitherto neglected branch of his education; if he neglect to avail himself of them, he will run great risk of being beaten out of that market of the world which he has long been accustomed to consider his own. Although I do not think that Hastings could make out a sufficiently strong case to induce the government to give us a school of design, there is no reason against our doing, in a small way, something for ourselves (*hear, and applause*). That we have amongst us those of the operative classes capable of executing very beautiful works of art, the stone work of the two new windows in St. Clement's Church, for which we are indebted in one instance to the liberality of our excellent rector, and in the other to the public spirit of our tradesmen, testifies amply. And why should not those who can execute so well render themselves sufficiently qualified as designers, to supply most, if not all, the architectural requirements of such a town as this? The remains of Greek art, which constitute the canons of the classic style of architecture, are but few in number; and useful editions of those works in which they have been delineated, measured, and analyzed, are quite within the compass of our means; or if not, I trust they soon will be; and they are sufficiently intelligible to be mastered by any industrious young man who might apply himself heartily to the subject in his spare hours (*applause*). With regard to the pointed styles of architecture, although the elements are not so obviously simple, and the difficulties consequently greater, we yet know that a sufficient degree of fundamental knowledge to design simple buildings with great propriety is attainable by those who can be supposed to devote only intervals of time to such studies. Of this we have many proofs in the school houses, and even churches, which have been erected from the designs of clergymen and other amateurs of art. Nay, it is said—and I fear the authority is unquestionable—that even such miracles of constructive skill, and of decorative magnificence, as the cathedral of Winchester and the chapel at Windsor, were not only designed throughout, but that their construction was actually superintended by dignified ecclesiastics, men whose thoughts and whose time must of course have been otherwise greatly occupied. Who then shall say either what ought not to be attempted, or what may not be achieved by an earnest devotion of the spare time of even a Hastings stone-mason? (*applause.*) And in respect of architectural models, few places are more favourably circumstanced than Hastings. Within a short distance we are surrounded by ancient structures of great interest. Battle Abbey still retains enough of instructive material, whether as regards plan, construction, or ornamental detail, to form a school in itself. In nearly the same direction we have Bodiam, from which many a valuable lesson and useful study may be derived. The gates, churches, and other ecclesiastic remains of Rye and Winchelsea teem with instruction. Where can you find finer models of decorative taste, or of more artist-like executive skill, than in those exquisitely beautiful monuments in the church at Winchelsea? What a valuable exercise would it afford any young man, who had acquired some knowledge of the principles of the pointed style, were he to attempt, on paper or in model, the restoration of those fine remains at the Friars! If we turn westward, we have Hurstmonceux; and can anything be more available or adaptable to the domestic requirements of the present day, than are the various elegant features and details of this so recently perfect, and even inhabited mansion of the olden time? From Hurstmonceux it is not much more than an easy walk to Pevensey. Pevensey, whose grand and massive cylinders of peculiar masonry, carry our thoughts through and far beyond the middle ages, fixing them at once upon both the arts and arms of that mighty and awful people whose insatiate appetite for power, "grew by what it fed on"—who, trampling all nations under their feet, went about seeking whom they might devour—"the abomination of desolation," spoken of by Daniel the Prophet. Allow me but a minute in conclusion, to call your attention to one of the many important contingent effects which I think may be expected from such associations as ours, and from such assemblages as this. In every Christian country it must be desirable that all classes should, as far as possible, be united by ties of genuine fellowship; but it is probable that in no country are wide-severing class distinctions so conspicuous as in our own (*hear, hear*). Attempts have of late been made, by certain chivalrous spirits amongst the great ones of the land, to break down some of these barriers; and it is allowed that in such a place as Lord's cricket ground a mechanic may match himself with a lord. Still we find that in all other places the *nole me tangere*—the "touch me not" feeling may remain as strong as ever. The fact is that cricket is not the right remedy for the evil complained of. There is little if any virtue in it. But there is much and great virtue in such pursuits as ours, which have a direct tendency, in many desirable respects, to assimilate the lower to the higher classes of society, and, by assimilating, gradually to approximate, if not eventually to unite them (*loud applause*).

The secretary, Mr. Banks, then rose, and gave a history of the rise and progress of the institution: after which several other gentlemen addressed the meeting.

At the conclusion of the several addresses, a series of very interesting dissolving views were exhibited under the direction of Mr. Banks, and these elicited the heartiest encomiums from the crowded, and apparently gratified audience; and thus terminated an evening's entertainment, which could only be regarded as pregnant with consequences highly favourable to the future prosperity of the institution.

ON TENANT-RIGHT.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

SIR,—Much has been said and written lately on "tenant right." The subject is really a most important one; and it is high time that legislative measures should be taken to secure those rights. The best way to come to a proper understanding of the subject is for practical men, land-agents, and landowners, to discuss the subject in an amicable manner, in all its bearings. In the farmers' clubs in the south, and other parts of England, I see it is a prominent subject. As a practical man myself, you will perhaps have no objection to receiving my opinions on the subject.

The "tenant-at-will" system, under the present state of the law, is a most wretched one; and under it the agriculture of a country can never be expected to improve much. The present system of granting leases is little better. Most of them are made with the view of only protecting the landowner; and yet some of them are so foolishly constructed that, were all the provisions strictly carried out, the interest of the landowner would be materially injured, along with that of the tenant. Some of them are made in a perfect "dog-in-the-manger" spirit. Others are made with the intention of the tenant not fulfilling the conditions, so that the whip may be constantly hanging over him. Others are made with an honest intention of acting justly by the tenant; but from an ignorance of the landowner, or his agent, of the difficulties in cultivating some soils, and of the real expense of making improvements, they form erroneous views of what is really required in a lease, so as properly to secure the interest of both parties—for the interest of both must be considered, and secured in a proper lease.

I am decidedly unfavourable to the "tenancy-at-will" system, even with a law fairly protecting the tenant's rights. Poor Richard says, "two removes are as bad as one fire." And again, that "a rolling stone never gathers any moss." These maxims are more applicable to farmers than almost any other class of men. A farmer cannot change situations but his plans are disarranged for two years; and he has something to learn about his new farm which he did not expect. If he goes into another county, the soil, the climate, the customs and habits of the people, and the most profitable system of farming, may all be quite different to what they were in the district he left. He perhaps works away for years under his old ideas, till ruin, or a great sacrifice of property, has been the consequence. This is all independent of the actual expense of removal, which in some cases is not a little. Some landlords never remove their tenants under scarcely any circumstances; but this kindly feeling may be carried too far, even for the interest of the tenant. If a tenant be indolent, ignorant, or extravagant, the sooner he is parted with the better, not only for the landowner, but for himself and the country. Under a tenancy at will, a tenant can be removed any year, whether he be a good or a bad farmer. If he has a lease, and if he fails to fulfil the conditions of that lease, he can also be removed any year. Of course a landlord has the power to get quit of a bad tenant in either case. I have frequently known cases where the landowner has suffered very materially by a bad tenant; but this has risen entirely either from his own over-indulgence, or from gross neglect in himself or his agent, in not looking after him. Under the present law of landlord and tenant, the latter has no remedy against an unprincipled landlord.

Some men seem to think there is a difficulty in making arrangements between landlord and tenant, under a law securing the tenant's rights. There may certainly be some little, but it may be soon overcome if set about in good earnest. When once the arrangement is made, there will be little difficulty after. Upon this part of the subject I shall now give my ideas.

Supposing a landowner making arrangements with his tenants under a law securing the proper interest of both. Let a particular valuation be made of each farm, and a complete report of each made out. In these documents the true state of every field should be entered, whether wet, dry, clean, foul, fresh, or been long under tillage, old pasture, upland meadow, water meadow, &c. If in tillage, under what crop, and when manured; also the state of the fences, ditches, gates and posts to every field; the state of the water-courses, roads, buildings and yards, with the distance from the turnpike-road and the next market town. It would be as well to state the description of the soil and subsoil in each field. This would only want once doing, and the nature of these could always then be seen by merely referring to the report. From such data as the above, coupled with what will be the supposed average price of such produce as the farm is best adapted for producing, is, or ought to be, the groundwork of every valuation, whether for selling, buying, or letting. At present it is not expected, or usual, for a valuer to give all these particulars to his employers. Under a proper arrangement between landlord and tenant, it would be necessary that all particulars should be given in a clear manner, with the name, contents, and the annual value of each field or parcel of land; also the annual value of each building, with its description and measurement. These items would make up the gross annual value of each farm, in the state it was then in. From the gross annual value should be deducted the tithe rent-charge, if any; the poor-rates, highway-rates, church-rates, &c. The average of these for seven or ten years preceding should be taken, and deducted from the gross rental; the remainder will be the fair rent payable to the landlord for the whole of the premises, if the landlord takes no part of these burdens upon himself.

I have said this would be a fair rent for the land and premises in the state they were in at the time of making the report and valuation. But supposing the present tenant had made permanent improvements either upon the land or buildings, within the last twenty years, or had lately highly enriched some part of the land by manure, let there be a particular statement of these made out, and the tenant's interest in these fairly stated. Then let the amount of this interest be paid by the landlord to the tenant, or a corresponding reduction of the rent be made for a certain number of years, so that he will be repaid in that reduction. Let this document, containing the particulars of the improvements, be appended to the general report of the farm, and let landlord and tenant each have a copy of both documents.

When these arrangements are completed, and the tenant is deficient of capital for making considerable permanent improvements, and the landlord can spare the money, let him do so, and receive a per centage upon the outlay. The amount of this per centage should be according to the permanency of the improvement. In some instances it should be low, and be a permanent addition to the rent; in other cases it should be higher, and then cease in a given number of years, as there are various improvements which are termed permanent which, strickly speaking, are not so. In cases where the landlords make the improvements, the tenant is at liberty to leave the farm any year without sacrifice, so far as to any improvements.

If both tenant and landlord are short of the cash for work of this description, either party might borrow of some capitalist, who must have security in the improvements if lent to a tenant (and he could give no other security), and must stand in the tenant's shoes, if he and the landlord parted before the loan was repaid.

Whether the tenant has the cash himself, or he borrows it, for making any improvements, and he and his landlord cannot agree together, a reference to the original report of the farm will make any arrangement easy in ascertaining the amount due to the tenant for unpaid improvements, or what will be due from the tenant to the landlord for any injury or waste upon the premises made by that tenant.

Before some descriptions of improvements are entered into by a tenant, it will be proper and necessary that the landlord should give his written consent to their being made. On the other hand, it is equally proper that the tenant should give his consent, in writing, for any great improvements or alterations which the landlord may make at his own expense, and for which the tenant is to pay a per centage. Sometimes landlords wish to make very considerable alterations, which are of no real use to a tenant. A tenant may safely be allowed to erect what buildings he may think proper, although the landlord may, if they part, think them useless. In this case, let the tenant remove them. Why is it necessary that a building, or a tree either, should belong to the freehold, merely because it stands or grows upon it? Naming trees brings to my mind another source of evil upon some farms. This is hedge-row timber. These trees spoil the fences and injure the crops on each side the fence for several yards. In making the report of the state of a farm, the number of hedge-row trees on it should be given, and the amount of annual damage they do to the land considered in the rental: also for any footways upon the farm. The best way is to state the amount of reduction on their account, and then the landlord can cut them down if he prefers the higher rent. On the other hand, if a tenant wishes to plant forest trees, either in hedge-rows or plantations, let him do so, and be paid for them, or allowed to cut them down when he leaves the farm; in short, have liberty to cut down all those he plants at any time. Why not have liberty to plant and reap a crop of trees as well as of potatoes or any other crop.

I am, sir, yours, respectfully,

W. Rothwell.

Winwick, Nov. 23.

MEETING OF THE DURHAM FARMERS' CLUB.

At the monthly meeting of the Durham Farmers' Club, held in October,

The SECRETARY having announced that the subject entered upon the books of the club for discussion that day was "The Tenant Right," by H. J. Spearman, Esq.,

Mr. SPEARMAN rose and said: When I undertook to bring under the consideration of this society that which you have just designated the very important question we are now about to discuss, it will perhaps be recollected I expressed an intention of doing so in the form of a resolution, which I also undertook to prepare, involving the question of tenancy generally, though, for the purpose of giving notice of the subject of discussion, it was sufficient that our secretary recorded it as being that which you have just announced, namely, merely "tenant right." The resolutions, then (for they are two in number), which I shall commence by submitting to you, are as follows :—

"1. That, in the case of a tenancy from year to year, or other short term, it is highly advisable that an express stipulation be entered into by the parties, in the form of an agreement in writing, securing to the tenant remuneration for all such outlay as he may have made beyond ordinary good cultivation, and on which he shall not have been reimbursed before the determination of his tenancy; but that the interference of the legislature would be inexpedient.

"2. That, though this species of tenancy may be considered the best when circumstances render it impracticable to calculate the average price of agricultural produce for a series of years to come, yet when this is not impracticable, the best species of tenancy is a lease for a considerable period of years, at a fixed rent."

In supporting these resolutions, I shall, with your permission, reverse their order by applying myself in the first instance to that which stands the last, and alleges the superiority of a tenancy under a long lease, with a fixed rent. That it is infinitely preferable to any other species of tenancy where the circumstances adverted to in the resolution admit its adoption, whether considered in regard to the interests of the tenant, the landlord, or the community at large, long and most attentive consideration of the subject has thoroughly convinced me. And here I must be permitted to say a few words in reference to the interests of the tenant on a subject on which we have recently heard a great deal, namely, "tenant independence," and on which I must say I think we have heard a great deal of idle declamation and of very shallow and mischievous sophistry. I by no means herein mean to impute in all cases mischievous intention; but error is at all times hurtful, and, whether proceeding from evil intention or as the propagation of any false notions, having the effect at the present time of engendering an ill feeling between the landowners in this country and their tenantry, must be attended with mischievous results, seeing that there never was a period in which it was more desirable that they should be on good terms, that they should pull all together. I do not mean for political purposes—quite the contrary—but in promoting their mutual agricultural interests. The present posture of agricultural affairs in this county does certainly, as we all frequently hear, demand great and increased exertions on the part of the farmers; and I, for one, though a landlord, have, as most of the members of this club know, always maintained that it will also require most considerate and liberal dealing with their tenants on the part of the landlord. That it is their interest thus to deal, considered in a mere pecuniary sense, as well as their duty, I contend may be proved to demonstration, to all those at least who know anything of agriculture practically, and who know how short-sighted and ultimately ruinous it is to drive men on to racking cultivation; and as, according to the maxim, "he gives twice who gives quickly," so I am sure the landlord who promptly gives way in the matter of rent when the occasion fairly requires it, does so with double effect as regards his tenants and his own ultimate interests. I hope and trust, nay I sincerely believe, the landlords of this country are well disposed thus to deal with their tenantry, to attend to and promptly to comply with their just claims. What, then, is the meaning of the cry about tenants' independence, as though it were a something to be wrested from landlords, and for which a war with them is waged? Rely on it, every man, tenant or not, has his independence in his own keeping; and I fear the battle to be done for its preservation is most frequently required to be done with ourselves. Do I counsel dependence, because foolish? No: rather pay to the uttermost farthing the value of your land than compromise your independence by throwing in a modicum of subserviency to eke out rent. What is there in the relationship between landlord and tenant at this day necessarily interfering with independence, at least when the tenant pays the full value of that for which he has contracted, and takes common precautions in having his contracts properly ratified? It is no small part of wisdom to avoid placing ourselves in the way of temptation; and if annually or frequently negotiating a renewal of a tenancy, in which increase or diminution of rent is a prevailing topic, has or may have a tendency to induce the adoption of modes of payment other than money or money's worth, tending to a concession of independence, then I say in a tenancy for a long term at a fixed rent we find the best security against temptation, and the best protection for independence. A long lease of any kind is calculated to afford this kind of security and protection, and security from the mischief of fluctuating prices in the case of a fixed rent may be effected by having recourse to the system of corn or fluctuating rents. But this system, as it seems to me, is essentially defective in the very important particular of the stimulus and incentive to energy and exertion which a fixed rent applies. The end and object of a corn rent is to obtain security and to meet the evils of uncertain prices and precarious times; and this it indisputably attains, especially if it be practicable, as it is now said to be, to introduce into our calculation the ingredient of fluctuating quantity as well as price. But, with security, it seems to me to induce relaxed exertion, abated energy. In the case of a fixed rent the lessee is fairly entitled, when negotiating for a lease, to offer such a rent only as the lessor could obtain from a person of average intelligence and activity; and he knows, therefore, that to the extent of his exceeding in those particulars will he be, and very justly too, a clear gainer. And herein appears the mode in which fixed rents conduce to the interests of the community, which consist in this particular—in the greatest amount of produce being annually derived from the soil which it is capable of continuously yielding. It has been urged, undoubtedly, that a long lease is not advantageous to the landlord, because a tenant, though cultivating his farm well during the early part of his holding, may be induced to relax towards the end of it, with a view to avoid having his rents raised on retaking it. This view of the matter is but a bad compliment to the honesty of the tenant farmers, and one which I am inclined to think they do not deserve; and it appears to me no less an ill compliment to their judgment. I am sure, at least, I address myself to no one now who would not rather give a high rent for land in a good state of cultivation, than a low rent for one in a contrary state; but, however this may be, I feel confident that the objection may be met by a well-drawn lease, in which considerable latitude may be left to the tenant in the matter of management and rotation during the early part of his term, but in which he should be restricted in these particulars towards its conclusion, and be bound to give up his farm at the end of it in a high state of cultivation. Another great recommendation which a tenancy under a long lease, at either a fixed or fluctuating rent, possesses over a short lease under the tenant-right system, consists in its exemption from the everlasting round of valuations, arbitrations, and litigation, which form a necessary part of the latter system, and which, so far as my experience has gone, generally terminate to the dissatisfaction of all parties. My second proposition admits, however, that, to render the adoption of the long lease and fixed rent system advisable, we should be in a situation to calculate pretty accurately what may be the average price of agricultural produce for a series of years to come; and I am afraid that, as yet, we are not so circumstanced. I am happy to think that allusion to the subject of corn-laws and protection is not prohibited by the rules of our society. We all remember the discussion it underwent some years ago; and I dare say it is not forgotten that I had the misfortune of standing pretty nearly alone on that occasion. That, however, did not deter me from expressing, fairly and fearlessly, my opinion; and I am bound to say I had a patient and attentive hearing. I am happy to think, however, that none of those heats and animosities were thereby engendered which some gentlemen out of doors, as the phrase is, prognosticated. It was a warm debate, assuredly, but I am sure I shall be borne out in saying it left not a trace of an unkindly feeling behind it. It will, perhaps, be recollected that one of the grounds on which I then advocated abandonment of protection and recourse to a natural state of things was, that by that means, and by that means alone, would the tenant farmer be enabled to calculate safely on future prices, with a view to long leases and fixed rents, no dependence being to be placed on artificial prices, trimming legislators, and expediency statesmen; and I do not think that subsequent events have at all tended to alter my opinion. I then maintained that, though under a system of entire free trade in corn, the price of corn in this country must fall to the level of the price of foreign corn, plus the cost of importation; yet that that would not be such a price as would ultimately drive a single acre of land in this country out of cultivation, seeing that rents and cost of cultivation might and would fall, *pari passu*, rendering free importation price yet a remunerative price, and leaving the British farmer still in possession of his own market. And on these points, too, my opinion is unchanged. But I owe it to truth and to candour to say that the present high prices, which I think likely at least to be maintained till our next harvest, despite the material alteration that has been effected in our corn laws, form no part of my calculation; and I am bound to say I think them attributable to peculiar circumstances, and that they will not be ultimately maintained. I must be permitted, however, to say that I also think the present unprecedented high price of agricultural labour, a main ingredient in cost of cultivation, is also attributable to peculiar circumstances, and will not continue. I think, then, that some time must yet elapse before any real farmers' friend can recommend to him the adoption of the long term and fixed rent system; and next in merit, according to my first resolution, stands a tenancy for a short period with tenant right stipulations. I know no language too strong in which to impress upon the tenant farmer, who, under a yearly or other short holding, performs anything like spirited farming, the wisdom and prudence and propriety of stipulating, according to the term of my first resolution, "in the form of an agreement in writing, for remuneration for all such outlay as he may have made beyond ordinary good cultivation, and on which he shall not have been reimbursed before the determination of his tenancy." I have used the terms, "outlay on which he shall not have been reimbursed," in preference to "unexhausted improvement," the common expression, because I do not think it a happy one, implying strictly, as it seems to me, more than the advocates of the tenant right system really intend. An equivalent for all that may remain unexhausted of improvement can only be claimed on the ground that the tenant, if continuing, would have had a right to go on actually to this kind of exhaustion, which I do not think is contended for: all I believe to be meant, at least all I mean, is a remuneration for outlay on which reimbursement shall not have taken place on the tenant's leaving his farm, and that, too, I beg to say, whether leaving it on notice from the landlord or of his own choice—I cannot see that these circumstances make any difference in the justice of his claim. Considerable practical difficulties do certainly present themselves in carrying out this form of tenancy. It is difficult to specify exactly the kinds of outlay on which remuneration should be made, to determine the question of whether and when reimbursement have taken place, and how and by whom these points may be best ascertained and adjusted. I do not think, however, that these are insurmountable difficulties. But, addressing myself now to the question, whether the interference of the legislature be or be not expedient, one cannot but ask how, if these matters be of difficult adjustment by parties having only their own peculiar case to provide for, is the legislature to be expected to deal with them? Every case must, as I have said, have its peculiar circumstances, for which the parties concerned might, I think, easily provide; but how is the legislature to form a code of stipulations calculated to meet and to supply in advance what may be required in all possible and imaginary cases? All this, I maintain, can be much better effected by the parties themselves, which seems to me to present one of the great objections to legislative interference. Such interference, in truth, I contend would be at variance with every principle of wise legislation. There is no stipulation which, as I have said, the parties themselves in this matter, using due diligence, may not now make for themselves, and more effectually, too, than the legislature. "*Vigilantibus non dormientibus leges subserviunt*" is a wise legal maxim, and one, I think, equally applicable to legislation. What would be said of the legislature being called on to frame a form of wills for parties who had neglected to make them for themselves? But, furthermore, how would it consist with justice and policy were the legislature to confer on one set of men the power of rendering another responsible, rendering them, in short, debtors to an unlimited amount, without, in legal phrase, their knowledge, consent, or privity, directly, perhaps, contrary to their wish, had they had an opportunity of expressing it, and to an amount, it may be, beyond their ability to pay? I have heard it said, however, "Oh, we don't mean that landowners should be made responsible in this way unconditionally; it must be provided that they have notice of what is going to be done, and be consenting." But if this sort of option be left them, if they possess a veto, then it resolves itself into a matter of stipulation and agreement, after all, which, as I have so often said, needs not legislative interference, and can be best arranged without. In short, the legislator is to be called upon to do either a work of mere supererogation or of injustice and impolicy. I am far, however, from maintaining that our law of landlord and tenant does not, in several particulars, stand in great need of alteration and amendment. I confess I think it indicates, in many instances, the hand of the landlord rather than that of the tenant. Take, for instance, that of the restriction from removal, by the agricultural tenant, of any building he may have erected, and for which his landlord does not choose to make him any allowance. A "tenant right" of carrying out his building fancies *ad libitum*, and charging them to his landlord, is quite another affair. There is one particular, however, in which I have lately not unfrequently heard the existing law charged with bearing hardly on the tenant, in which I am disposed to think it in reality tells the other way: I mean the power given to the landlord of seizure for rent, and that of preference over other creditors. Now, I am not debating the point of justice as between the landlord and other creditors, but that of the interest of the tenant; and I contend that, in those parts of the country in which, like our own, the practice prevails of allowing a current half-year, the landlord's preference to other creditors enables him to grant this without risk to himself and without cost to the tenant. It makes him, in short, to lend, as it were, half a year's rent to his tenant without loss, on this kind of statutable security. Were it otherwise, he would probably require prompt payment of rent, if not what is called "forehand rent." To the great majority of the tenantry in the north of England, then, I am sure that an alteration in this particular would be by no means acceptable. But I have already detained you too long; and I fear that, though I have by no means exhausted the subject, and have, in truth, left many points unnoticed on which I had intended to have dwelt, I may have utterly exhausted your patience; and I shall conclude, therefore, by moving the adoption of the resolutions I have submitted to you.

Upon the CHAIRMAN inquiring if any gentleman had any observations to make upon the question which had just been so ably introduced by Mr. Spearman,

The Rev. J. TYSON rose and said: It is a subject upon which I have never bestowed much thought, and therefore it would be unwise in me to give an opinion; but there are two points, which have been mooted by Mr. Spearman in the most handsome manner, upon which I will offer a few observations. One is with regard to the independence of the tenant. Now I hold that to be a perfect bugbear. I cannot understand how a tenant or any other man can be independent. We are all dependent one upon another, knit together like unto a golden chain which hangs from the heavens to the earth (applause). None of us are independent of one another; and I think it is one of the most beautiful provisions of Providence that this is so (applause). Whatever may be the power that unites us—whether it is from character or from station, or the bestowal of favours, or gratitude for those favours bestowed—it appears to me that mankind are so bound up together that no one can be independent of another (applause). In this country I hope that what is called the independence of the tenant will never occur; for, if it were, extreme differences of opinion, and what I call a disagreeable catastrophe, would ensue. It would place the tenant and landlord in antagonist positions, and the present beautiful arrangement would be destroyed. Now, the one receives and the other bestows; the landlord looks upon the tenant as a person he is interested in aiding and assisting, and thus society goes on flourishing; and I should deeply regret if anything were to occur to disturb the harmony which thus exists (applause). The other subject to which I allude is Mr. Spearman's views regarding the operation of the corn laws, or rather regarding the effect which the repeal of these laws will have upon the value of corn in this country. He stated, as I understood him, that the recent measure will have the effect of reducing the value of the produce of this kingdom to the average value of the productions of foreign countries, with the exception of the difference of transit. Now, I hold it that the statement of Mr. Spearman upon this point is undeniable; but, at the same time I maintain that the result of such a state of things, if completed, will be of a more disastrous character than anything that ever happened to this country (Hear, hear). Loaded as we are with high rents, loaded as we are with taxes, burdened as we are with high wages, can it be supposed for a moment that we can compete with the agriculturists of the continent? (Hear, hear.) While we pay day labourers half-a-crown a day per head wages, on the continent they only pay 7d. or 8d.; and where a farmer in this country pays 30s. or £2 a year per acre rent, the continental farmer pays at the utmost 5s. or 7s. 6d. per acre. Is it possible, then, I ask—can common sense draw the deduction—that under the existing state of things we can produce corn at such a price as will enable us to meet them in the market? (applause.) I possess no principles of reason which will lead me to draw such a deduction; I am utterly at sea, with no compass to guide me to such a conclusion (applause). I hold it that it is as utterly impossible of accomplishment as that the east should join with the west, or the north with the south (applause). Such are the views I have always entertained upon this subject. I have never altered them, but when I see reason for doing so, I shall very gladly bow to the statements and arguments of those who are opposed to me. I am not bigoted in my views. I sympathise most sincerely in the wishes and hopes of the gentleman opposite; but I state it as my firm conviction that if the price of corn in this country is to be brought down to the average price of that of the continent, it will be the ruin of this great empire (applause).

THOMAS CROFTON, Esq., of Holywell, said: It is not my intention to trespass long upon the time of this meeting; but there are one or two points which have fallen from Mr. Spearman—in the most handsome manner, I admit, to which I feel I ought to reply. I will first, however, allude to a matter which seems to have escaped the attention of Mr. Spearman, when he talked of tenants' rights and the taking of leases, which I consider of the highest importance, and that is, the injury done to a farm by game (Hear, hear). This is a source of greater grievance to a farmer than almost any other. A tenant takes a farm, for instance, and he neglects to make a reservation that the game upon it shall be his. The landlord comes, and stocks the farm with game. What, I ask, is the position of that individual? You may talk about improving the land; but I am of opinion that all the improvements to which allusion has been made are of secondary importance compared to this subject (applause). The injury committed by game is almost incalculable. I believe there is one farm upon the estate of Lord Prudhoe, where, a few years ago, the whole of the crops were destroyed by game. I know of several others which I need not mention; and I believe that, unfortunately, game is greatly increasing in our own neighbourhood (Hear, hear). Now, what I would recommend the tenant to do under these circumstances is this—when he thinks of taking a lease, take it upon the principle adopted by the Dean and Chapter of Durham, namely, a lease for twenty-one years, renewable every seven. I know of no plan more secure than this, and it is one which would do away with all those vexatious grounds of objection to which allusion has been made (applause). In that lease he must also have a reservation that the game shall be his property (applause). It is all very well for gentlemen to talk about enjoying the sports of the field, and thus preserving an enormous amount of game; but supposing that such a reservation as I have described were granted in all cases, I feet quite certain that there is such a spirit in the British farmer, that, where he knows he has a landlord who is a sportsman, he will protect to the utmost the game that he may require (applause). At the same time, I must be permitted to observe that there is that spirit in him which will not allow him to condescend to support that game when he sees that it is preserved for the benefit of the game-keeper or his friends, and that when killed it is exposed for sale in the public market (applause). I, for one, will never take a lease without a reservation secures me the game; and if the game is not to be mine, I will not take a lease at all (applause). When we see a landlord desirous of possessing sporting occupation, no farmer will oppose his wishes. All he wants is fair compensation for the injury which that game may commit, and I believe there is not a tenant in this country who is not anxious to see his landlord supplied with game if he desires it. But when the whole crops are destroyed by rabbits or other game, I think it is but fair and reasonable that the tenant should possess the right of destroying them (applause). When I found that Mr. Spearman had omitted to allude to this part of the question, knowing him to be a good sportsman, I could only attribute it to forgetfulness; and feeling that it was a subject of the greatest importance, I considered it was my duty to call the attention of the society to it (applause). Mr. Spearman has stated that he does not think the present prices of corn will be maintained: I fully agree with him. It is only two months since he asked this club, at the instance of a gentleman with whom he is acquainted, its opinion with regard to the average yield of the country this season. At that time I stated as my opinion that the yield in every description of grain was much below an average one. This opinion has since been found to be correct; and I have no doubt it will be found so with respect to the yield throughout the whole of the kingdom. When gentlemen have stacked their corn, it occupies such a small space that they fancy a portion of it must have been taken away; and I recollect the case of one person who four years ago had great difficulty in leading the produce of a field in two days; this year, however, with the same means, he has led it with ease in one (Hear, hear). Look at the corn, and you will find you have not half the straw you had in former years; and will any person tell me he ever saw a large yield obtained from small heads and little straw? (applause). The deficiency of yield, then, combined with the failure of the potato crop, has had the effect of causing the price of grain to spring up in every part of the country; and my own opinion is that it will advance still higher.

John Smith, Esq. (Brancepeth), then moved that the further consideration of the subject be postponed until the next monthly meeting of the club.

Mr. Spearman seconded the motion, and, in doing so, said he should reserve his reply until that occasion.

A short discussion then took place with respect to the effect which it was anticipated the recent repeal of the corn law protection duties would have upon British agriculture; after which thanks were voted to the chairman, and the meeting separated.

NEWCASTLE FARMERS' CLUB.

At a meeting held October 3rd, Sir M. W. Ridley, Bart., in the chair—

A paper was to have been read by Dr. Richardson, on the nature of soils; but in consequence of his inability to attend, Mr. Thornhill, the librarian at the Literary and Philosophical Society, delivered a lecture introductory to an essay on grasses, which he will read in December next, and the principal object of which will be to enable the farmer readily to distinguish the different kinds, especially those which are of value in agriculture.

Mr. Thornhill said, in the cultivation of the grasses, whether for meadow or pasture, there are two principal points to be considered. The first, as to which kinds are best suited to particular soils and situations; the second as to which are worthy of cultivation and which are not; which kinds, in fact, should be encouraged, and which should be destroyed as noxious weeds. For the farmer to be able to select the kinds most suitable for his purpose, he should have such a knowledge of them as will enable him to distinguish the various species one from the other, as they grow in his fields. He can, indeed, easily enough obtain a list of those considered the best, and he can purchase from dealers the seeds, or reputed seeds, of such grasses as he may wish for; but unless he can recognise the plants themselves, he cannot be sure that he has been honestly dealt with; and further, he cannot know whether or not his lands already produce the kinds best suited for his farm. As it is my intention principally to endeavour to point out how to distinguish one grass from another, I shall be obliged to enter a little into a consideration of what may be called their purely botanical characters. In passing, also I shall briefly mention the place grasses occupy in the vegetable world, as this also is necessary in order to understand works which giving a general history of plants, of course include grasses amongst the other objects of which they treat. The surest way to enable any one to know one kind of grass from another, is carefully to study the structure common to all. The grasses form what is called a very natural group in the vegetable kingdom: that is, from their great general resemblance to each other, they seem, as it were, naturally to class themselves together. Everybody knows a grass at first sight; whilst, in other tribes of plants, the resemblance of one to another not being so striking, they are the more difficult to arrange in groups. It is this general resemblance to each other of the grasses, that renders it the more difficult to distinguish the different kinds; therefore it is the more necessary that the general structure should be understood. A thorough knowledge of this once attained, the modifications peculiar to individual kinds will soon be mastered. Whilst I mention what I believe to be the only mode of easily distinguishing the grasses from one another, I do not mean to say that there are really any mighty difficulties to be overcome; all I wish to show is, that this, as well as any other branch of knowledge, can only be obtained by earnest attention to the object in view. The structure, especially of the flower in the grass tribe, differs somewhat remarkably from that of most other plants. Their hollow-jointed stems, long ribbon-shaped, straight-veined leaves, and indeed their general habit and appearance, sufficiently distinguish them. But it is in the structure of the flower the tribe to which they belong differs most remarkably from the vegetable kingdom. By a careful examination of the external and internal structure of plants, we find that certain characters are common to one set or group, whilst other characters are common to another group. The flower being a most important part of a plant, inasmuch as it is the organ by which the seeds are produced, it is natural to suppose that if it differ any way remarkably in different plants, this difference will also indicate a difference in the general structure of the plant. The leaves are also extremely important organs in vegetable economy. In all the trees of this country, and indeed in nearly all European trees, the leaves are expansions of the bark, and are traversed by veins, as they are called—those veins being extensions of the materials of which the wood is composed. Is most of the trees and herbs of Europe the veins of the leaves form a sort of irregular network. In the tribe of plants to which the grasses belong the veins of the leaf are usually nearly parallel. Now, straight veins in a leaf usually indicate that the plant, with such a structure, belongs to one of the great divisions of the vegetable kingdom, into which nature, as it were, has separated plants. An oak, and indeed almost all the trees of Europe, have reticulated leaves. Their stems are divided into pith, wood, and bark; and the diameter of the stem increases by yearly layers of new matter being placed on the outside of that which had been formed before. Hence such plants are denominated oxogenous—a word meaning increasing externally. The reticulated leaf is almost always an indication of this mode of growth. The straight-veined leaf, on the other hand, is usually an indication of a very different structure of stem. Palm trees, grasses, lilies, &c., &c., have stems constructed of precisely the same materials as oaks or other timber trees, but those materials are differently arranged. The stem of a palm tree may be said to consist of a mass of pith, in which are immersed bundles of the fibres which constitute the wood and bark of other plants. All new matter added to the stem is deposited at or towards the centre. Now, the cylinder which composes the stem of a grass is, when examined, composed of materials arranged precisely like those which form the solid stem of a palm. Hence such plants are called endogenous. In the bamboo, which is only a gigantic grass, the structure is more easily seen; whilst, in a piece of cane, which is also a grass, you have a solid stem just like that of a palm tree. If we wish to know the class to which grasses belong, we, judging from the straight-veined leaves, would arrange them amongst endogenous plants. I will mention another way in which endogenous plants differ from exogenous plants. Nearly all the plants of those two tribes have seed leaves—the leaves, that is, which are first developed when the seeds germinate. These are called cotyledons. Exogenous plants have two, as we see in the raddish. Endogenous plants have only one, which may be observed at one end of a grain of corn, and may be extracted if we steep it for a short time. Hence we have another mode of distinguishing the two tribes which are often named in consequence—dicotyledons and monocotyledons. To find the subdivision of the order, as it is named, to which the grasses belong, we must principally examine the structure of the flower, which, as I have already stated, serves also, to a considerable extent, to distinguish the various kinds, the one from the other. To understand the botanical description of a grass, we must also understand a few botanical terms. Thus the general arrangement of the flowers upon any plant is called the inflorescence. Of this there are many varieties. The form which almost universally prevails amongst the grasses is called a panicle. The arrangement of a panicle will be best understood by referring to another very common form of inflorescence, as in the common red currant, for instance. In this we have a stalk, along which are arranged at intervals numerous flowers, each having a stalk of its own. This is called a raceme, or cluster. The panicle differs from this only by bearing branches of flowers, where the raceme bears only one. There is also a form of inflorescence to which, in appearance at least, the flower-heads of many grasses approximate. This is what is called a spike. The arrangement of the flowers on a spike is the same as in the raceme, but the flowers are seated on the central stalk without the intervention of a stalk to each. The common rib-grass furnishes an example of a spike. And, as you know, many grasses have their inflorescence in appearance much resembling that of the rib-grass, so many authors have applied the term spike to the inflorescence of different grasses. But the shape and appearance of the inflorescence of some of the grasses are all that they have in common with the spike, properly so called. In the spike several flowers are arranged, without stalks, along a central stalk. In those grasses which have a spike-like inflorescence, there is also a central stalk; and from this central stalk spring clusters of flowers, not single ones. Hence, in such cases, it is more correct to say that the panicle is spiked or spike-shaped; and such is the way in which grasses, whose inflorescence resembles a spike, are now usually designated. We have, then, in the first place, the terms applied to the inflorescence of grasses, viz., the panicle and the spike-shaped panicle—this last being by some authors simply called a spike. Our next object is to consider the structure of the flowers of which the panicle is made up: and here again we find that various names have been applied to the different parts of the flower. Some authors adopt the terms usually applied to ordinary flowers, whilst others have invented a special set of terms to designate those parts of the flowers of a grass which are peculiar to that tribe. You all know, that in the flower of a buttercup for example, there is first a pale green cup formed of several leaves; this botanists call the calyx. In this green cup rests the part of the flower from which the plants derives its name—a sort of cup, formed of several yellow leaves: this is the corolla. Within this are the organs which are common to all flowers, the grasses as well as every other flowering plant. The row or rows of bodies inside the yellow cup are called stamens; inside these is the pistil, or young seed-vessel. The pistil is, as I have said, the young seed-vessel; within it are the ovules, or young seeds. The stamens throw out a sort of powder consisting of little grains, which, by communicating with an ovule, renders it fertile. It is not our business to-day to enter further into the physiology of plants; but I may remark, that this branch of botany, as it is usually called, is, according to my notions, peculiarly the province of those whose business it is to cultivate plants? because there can be little certainty in judging as to the best mode of feeding plants, unless we are acquainted with the laws of life, so to speak, by which they exist. I have already said that the inflorescence of the grass-tribe—the gramineæ or gramenaceæ, as they are denominated by different authors—is a *panicle.* I must state, also, that the peculiar hollow-jointed stem of the grasses of temperate regions is called a culm, by many authors; a term not necessary, because the so-called culm is the stem of the grass; therefore, as is remarked by Dr. Lindley, the term stem is sufficient; but as the former term is used in several valuable botanical works, it is necessary to mention it. The inflorescence or panicle of a grass is usually made up of several clusters of flowers. Each of these clusters is called a locusta or spikelet, and the parts of the flower itself are now generally called bracts or scales. The central stalk from which the clusters of flowers spring is called the rachis. Although the terms before mentioned as being applied to the parts of ordinary flowers are applied to grasses in many works on botany, I shall point out, as I go on, the parts to which these terms have been applied. The locusta or spikelet is seated, as it were, in two opposite bracts. These bracts are termed empty, because they do not contain stamens and pistil. They also, although opposite, are not exactly on a level, the base of the one being a little above the base of the other. These two bracts are what the celebrated Linnæus designated glumes. Hence plants possessing such appendages have been named Glumaceæ; in other words, glumaceous plants. Above the glumes is one of the clusters of flowers before referred to, each cluster being fitted into a sort of hollow or denticulation of the rachis or common footstalk. Each flower of a cluster is called a floret. The structure of each floret is as follows:—There are first two bracts, one with a midrib usually elongated into a bristle (the awn). This bristle does not proceed immediately from the apex, but separates from the bract a little below; this bract always faces the rachis. The other bract is placed with its back to the rachis, it has no midrib, is divided at the apex, and its sides are inflexed, with a rib at the line of inflexion. Within those bracts, and opposite to them, are two extremely minute fleshy scales, and within these again are the stamens and pistil. With respect to these last, I may conclude my lecture my stating that each stamen consists of two parts—the anther, which contains the pollen, and the filament or stalk. That the pistil consists of the stigma, or point, of a style or styles and the ovary; and that every British grass, with two exceptions, has three stamens and two styles. We see, therefore, that our grasses mostly belong to the class Triandria, and the other Monogynia of Linnæus, and that they are endogenous and monocotyledonous. The natural order to which they belong give the name to themselves—Gramenaceæ, or Grameneæ. In the next lecture I shall proceed to the description of such grasses as I may consider worthy of notice, and shall point out, as far as I can ascertain, the qualities of each kind.

Mr. Thornhill illustrated his lecture by several original drawings (many of them made under the microscope) of the structure, &c., of those portions of the vegetable kingdom to which he found it necessary to allude.

YORK FARMERS' CLUB.

The first general meeting of the members of this valuable institution, for the discussion of a given subject, was held in this city, on Thursday, H. S. Thompson, Esq., of Fairfield, the president, in the chair. The club appears to be in a most flourishing condition. Mr. White, the secretary, announced a donation of £10 from the Hon. Octavius Duncombe, and one of £5 from G. L. Fox, Esq., of Bramham; also additions to the library by Thos. Hodgson, Esq., and J. Turner, Esq. He stated, too, that the list of subscribers had been augmented, and that the club now numbers 108 members. It was resolved that a register office for all classes of agricultural servants shall be established in connection with the club, and the purchase of a microscope for the use of the members was authorised. After some other business of a routine character had been disposed of, the chairman made a few observations urging the importance of the institution, the satisfactory position of which he commented upon in congratulatory terms, He then introduced Mr. Hawking, of Linton-upon-Ouse, whose name appeared on the notice paper as the proposer of a discussion upon

"*The Cause and Modes of Prevention of the Black Head or Smut in Barley.*"

Mr. Hawking said, every practical farmer must have observed with considerable concern the deteriorating effects of this disease, which had long been visible in the barley and wheat crops. No doubt some would agree with him that upon a moderate calculation there was no less than one diseased head in every twenty, and in particular cases as many as one in every six or ten, the loss to the consumer being something like one quarter in every twenty, or one acre in every twenty, on the average; and in the special case one quarter or one acre in every six or ten. Finding this to be the case, it became them to unite their efforts to remove the disease, if possible. It had been said by a celebrated writer that the individual who could cause two heads of corn to grow where only one stood before, was deserving of his country's praise. That was true, and it was equally applicable, he thought, to him who, by dint of industry or scientific skill, could so explain the mysteries of the disease in question as to cause its removal. (Applause). After alluding to the different names given to the disease, viz., "smut," "burnt-ear," "burnt-head," "slain," &c., he noticed the fact that it was more difficult to prevent or cure the disease in the barley than in the wheat crops, and he then stated some of the causes which had been advanced of the smut or black head. These were a humid state of the atmosphere long continued, an epidemic state of the atmosphere, want of sufficient light, alternations from hot to moist weather, long-continued hot and dry weather, want of a due supply of air, accidental mutilations, change of climate, an undue supply of moisture, &c. During the last three years he had observed, upon some hot sandy land which he occupied, and which never grows much straw, that the disease had been more prevalent there than on any other part of his farm. On this land, after the heaviest rains in winter, there was never a particle of water to be seen. This proved that the disease was not confined to wet land. The next experiment he mentioned was one which he made two years ago. He then broke out some fresh land, on which he sowed some oats. The land was perfectly dry at the time, and the oats quite healthy, but they produced a great quantity of black or burnt heads. He thought too that the objection with regard to the too rapid succession of wheat crops as tending to encourage the disease was not to be relied upon, for whilst he never had two wheat crops successively upon his farm when it could be avoided, his neighbours were in the habit of adopting that plan, and still he had observed the disease to as great an extent upon his farm as upon theirs. (Hear, hear). In 1840, he let a neighbour of his have a quantity of yellow chaff wheat, and he took his neighbour's in return. The wheat which he got was fine looking wheat, and had no appearance of smut or black head about it; but when it came up, and shot forth, he supposed there was not less than one diseased head for every six or ten good ones. He was naturally grieved at this result, and he determined to try this experiment. He made a solution of one pound of arsenic and half a pound of pearlash, which he applied to twenty-four bushels of the seed, which he dried with quick lime, and drilled in, and he saw no black heads except in one particular part of that crop, and that was where the men had fallen short of the steeped seed, and had used some that had not had this solution applied to it. (Applause). He might here mention that he had noticed some of his neighbour's crops to which salt had been applied as a solution to prevent the black head, and it had not proved effectual. As regarded the origin of the disease, he must admit that he felt great difficulty in giving them anything like an accurate opinion, beyond stating that, as far as he had been led to make observations, it was either by infection or inoculation. The difficulty in this respect was increased by reason of the many different opinions that had been advanced by learned and scientific men. Some say that the disease is produced by fungi or seed which is first scattered on the land and then absorbed by the roots of the plants; others attribute it to insects; others to the injured stems or bruised grains of the corn; others to sudden changes of the atmosphere and an unnatural state of the soils. Observation had taught him that sudden changes and unnatural seasons were very productive of black heads in corn, but he could not see how they could be instrumental to the origin of the disease. He had noticed that the disease, especially in barley, was as visible on dry as on wet soils, or rather that dry soils produced the black head as extensively, though not so conspicuously as wet soils. Agriculturists observed it more on wet than dry soil, because the wet land was impoverished by the water, and produced the crops in a more defective state. It was a fact which the farmer often forgets, that if soils are saturated with water, they require more frequent tilling than dry soils do, to make them yield the same proportion of grain. (Hear, hear). He did not agree with the suggestion that the diseased stems produced the black head, and for this reason that he had observed stems cut down by game, cattle, &c., which did not exhibit the black head more than those stems which remained upright immediately adjoining. He was of opinion that the disease commenced with the origin of the plants' existence, for if they took any particular blade which they might notice from its colour or some other peculiarity, and examined it as soon as it was formed, they would find that in that stage it had a black appearance, and was diseased, perhaps to the extent of one-sixth or one-eighth of an inch in length. (Applause). He considered the proposition that broken grains were productive of the disease was also groundless. The Rev. Dr. Hale, who was an authority to be relied upon, used to entertain the opinion that grains injured by the thrashing process produced the smut; but one day he went into his barn, took up a few grains, beat them in a mortar, and then planted them in his garden, and the result was that they did not produce a single black head. (Applause). Mr. Hawking proceeded to state his reason for thinking the disease was produced by inoculation or infection. The fungi, he said, must first take possession of the germinating parts of the seed before it can transform the seed's nature into one like its own. That must be done by their coming in contact with each other—not rustling together in the field, but after the cuticle which contains the smut is broken, and the smut is deposited in the chaff of the ears of corn, and lodges there till after it is sown, when the fungi is absorbed by the grain in its germinating or growing process; and I think the fungi which rests in the grains of corn is not effectual, unless it first takes possession of the eye, or approaches near to it. A certain professor states that in one of these smut balls there are four million smaller particles, or balls, and if this be the case, and they all take effect, the whole of our crops will soon be impregnated after the first few black ears are seen, if the disease be not stopped. (Hear, hear). After these statements as to the cause of the smut or black head in barley, you will naturally expect from me something like a remedy. Year before last I adopted this means. I made a solution of ammonia, and I applied it more to invigorate the germinating process of the seed and to make it more rapid than with a view to remove the disease. This year I adopted a similar process with regard to my barley; that is, I first washed it, then steeped it (24 bushels) in a solution of one pound of arsenic and half a pound of pearlash, and drilled it with quick lime. I tried some without any solution, and the result was that when the head shot forth, there appeared to be something like one-third less of smut or diseased heads among that which had been washed than there was among that which had been drilled without any solution being applied to it. (Hear, hear). After stating his intention to try the experiment next year with a stronger solution, which he thought would be more efficacious, Mr. Hawking concluded by expressing a hope that the meeting would not glide down the stream peacefully together, but that there would be some diversity of opinion among them, inasmuch as it was by the force of argument that the truth at which they all aimed must be revealed.

Mr. O. A. MOORE, having drawn a distinction between the internal and external disease, premised that they were, on this occasion, speaking of the latter; and he then observed that he differed a little with Mr. Hawking as to the origin of that disease. He was of opinion that the disease was taken up from the soil by the young germinating plant, and carried up, through its stem, to the flower, where it made its appearance. If this were so, the means to be adopted should be similar to those recommended by Mr. Hawking; that was, the application of any solution which would prevent, as arsenic would, vegetation in the spores of the fungi, and the adoption of such measures as would dry the soil.

Mr. HAWKING, in answer to the chairman, said he had observed the disease as much where the land had been well limed as the contrary.

Mr. E. ALLEN was of opinion that the disease was attributable to a cryptogamic plant which adheres to the barley and introduces itself into the circulation of that grain. If the disease were not something external and distinct from the barley itself, it was scarcely probable that the application of a mineral poison like arsenic would convert diseased into healthy grain. He thought the apparent remedy mentioned by Mr. Hawking was a confirmation of this proposition. (Hear, hear).'

The CHAIRMAN.—With regard to your proposed remedy, Mr. Hawking. Arthur Young speaks of many experiments that were tried about the year 1780, in which arsenic was used, together with other solutions, and the one most effectual and destructive was that of lye and lime water—not washing the seed, but soaking it for 24 hours. In these cases (the wheat crop) I believe there was not a single ear of corn affected with this disease. Arsenic was successful, but it does not seem to have been productive of the same amount of success as lye and lime water. Now, fourteen years ago I tried lime-water, in which the seed (wheat) was steeped for 24 hours, and I scarcely ever noticed the disease. (Hear, hear). As to the origin of the disease, I am inclined to think that most of these things are epidemical—that they originate from atmospheric causes or from some local influence, such as the peculiar state of the soil, &c. I have no doubt that they may afterwards spread, as you suggest, by inoculation. (Hear, hear).

Mr. HAWKING thought that the state of the soil had not much to do with it.

Mr. E. ALLEN suggested that if a stronger solution were likely to prove beneficial, bi-chloride of mercury might be applied.

Mr. WHITE, not doubting the suggestion, cautioned the members of the club as to the use of that article, gave an instance of its extraordinary powerful properties, and took this opportunity of correcting a popular error into which the farmers generally had fallen when speaking of or purchasing arsenic, it being usually asked for as mercury, whereas the two articles, arsenic and mercury, are as distinct from each other as possible—the former being a white powder and an oxide of the metal arsenicum, the latter (mercury) a beautiful bright fluid metal, and commonly known as quicksilver.

Mr. WARE observed that up to the last few years it had not been customary to wash barley at all, but from what Mr. Hawking had stated, it appeared that to wash it even in water only was beneficial.

Mr. Hawking was induced by this observation to detail an experiment fully proving the truth of it.

A conversation of a general character ensued, and in the result, on the motion of Mr. O. A. Moore, the following resolution was adopted:—"That it is the opinion of this meeting that whether the cause of the disease called smut, dust-brand, or burnt-ear (*uredo segetum*), in barley, originates in the atmosphere or local influences, is not known; but that it is a fungus which is generally absorbed by the root, continued into the stem, and towards the parts of frutification, where it is developed; that it is very easily and readily propagated by infected seeds, and they recommend the remedy proposed by Mr. Hawking, namely, the steeping of the seed in a mixture of arsenic and pearl-ashes, in proportion of one pound of the former and half a pound of the latter, boiled in water for half an hour, this proportion being sufficient for twelve bushels; and they also recommend those other remedies which have been found most successful in the prevention of the same disease in wheat."

Thanks were then voted to the chairman, the proposer of the subject, and to Messrs. Moore and Allen for their kindness, in assisting the discussion, and thus the first practical meeting of the York Farmers' Club terminated in a most satisfactory and encouraging manner.

LANDLORDS AND TENANTS.—LARGE AND SMALL FARMS.

In the seventh century Belgium was a complete wilderness. It owes its agriculture to the abbeys and monasteries, to which grants of wild land were liberally made by the Frankish sovereigns. Montesquieu, in speaking of the grants of Charlemagne to the church, remarks that the princes of that time "regarded the immense gifts which they made to the churches, less in the light of a religious action than in that of a political dispensation." The monks of those times seem, from the accounts which we have received of them, to have resembled more the association which, under the guidance of a Wirtemberg clergyman, founded and brought into cultivation the settlement of *Harmony* in the United States, than the monasteries of later times. In the dedication of that most learned work "*L'Art de Verifier les Dates*" to Louis the Fifteenth, in 1770, the Benedictine authors observe, that "the fairest provinces of your kingdom were brought into cultivation by the hands of our fathers." It happens, singularly enough, that natives of that country which is now nearly the lowest in point of agricultural skill in Europe—Ireland—were among the first of these religious improvers of the soil. Cæsar Arelatensis, a Benedictine, speaking of the monks of St. Columban, a Scoto-Irishman, says, that "these good men had not dedicated themselves to God to lead an idle life, but worked with their hands, in order to bring waste lands into cultivation; to plant and build, not for themselves, for they lived in a most frugal manner, but in order to support the poor, so that wild and frightful deserts became in their hands agreeable and fertile places."

The Abbé de Nelis, in his Memoir on the Transactions of the Academy of Brussels, vol., ii, p. 292, speaking of the advantage which agriculture and police received from religion, observes, "It was to the establishment of the first abbeys or monasteries, of which St. Amand was the father and founder in our parts, that a new order of things is owing. When he appeared he found this country as wild as its inhabitants." Baudemond, a contemporary and disciple of St. Amand, who lived at Ghent in the Abbey of St. Peter, which had been founded a short time before, speaks of the country in these terms:—"Propter ferocitatem gentis illius vel ob terræ infecunditatem, omnes sacerdotes a prædicatione loci illius (the environs of Ghent) se substraxerint." Another writer speaks of it in the same style:—"*Qui* pagus (Gandensis) propter ferocitatem gentis et terræ infecunditatem prædonibus derelictus est." A third attributes to the country only "efferos mores et infaecundos cespites." Such was in those times Flanders, a country so populous and fertile some centuries afterwards, that in respect to the richness of the soil and industry of the inhabitants it has now for a long time been unsurpassed by any portion of the universe.

It appears from the old statutes of the religious orders, that after matins they were obliged to work with their own hands. The words to cultivate *propriis manibus* frequently occur.

Having obtained grants of waste lands of little or no value, the monks, partly by their own bodily exertions, and partly by the employment of labourers, in the course of time made Flanders the garden of Europe. The same sort of perseverance which they displayed in rearing those noble structures which excite the admiration of our times, they displayed in embanking rivers, draining morasses, and in conveying the slime and mud of their waters to the immense sandy heaths with which the country abounded. The Marquis de Mirabeau says, in the "*Ami des Hommes*":—

"It has passed into a proverb that the Benedictines lay out a hundred on their property to make it return one. I know on their estates causeways through marshes, or embankments against rivers, and other useful or necessary works, which have certainly cost three times the value of the whole abbey on which the construction was made. These long and expensive works, which are a sort of ambition and joy for corporations, which consider themselves as perpetual, always minors as regards alienation, but always majors for preserving, are beyond the means of individuals."

In the *Memoirs de la Société d'Emulation*, of Antwerp, vol. i, p. 70, a writer, speaking of the merits of the religious establishments in bringing land into cultivation which otherwise would have remained waste, observes:—

"I have said that these plantations had frequently been made by permanent and rich corporations, possessing an excess of annual revenue: being able to count on a permanent existence, they could hardly make a more advantageous or sure investment of their surplus income, than in increasing the value of the lands from which they derived this surplus; besides, being obliged by their profession and their property to assist all the necessitous in their neighbourhoods, it was their interest to look [illegible] them. The wages of productive labour were the alms most in conformity with the duties of morality and the dictates of policy. These corporations no longer exist, but I cannot help citing here the expressions of a memoir presented to the government in the year D.

"I should reproach myself for my pusillanimity, if, from political considerations, I were to avoid scattering a few flowers over the tomb of the religious corporations spread over these vast heaths."

There are the most perfect records of the progress made by the different religious houses in bringing Belgium into cultivation. The evidence of their merits as improvers is so abundant, that folios might be filled with it. The difference between the estates of the church and laymen was always most marked.

"If you discover," says an intelligent traveller, "fields well inclosed, carefully planted, and covered with abundant crops, those fields belong to the monks." . . . "I have remarked in the different journeys I have undertaken," says another traveller, "that the lands in the neighbourhood of rich monasteries, besides being well cultivated, are peopled by peasants who show by their dress and their vigorous and robust health, the contentment and abundance which they enjoy; while in the villages belonging to some rich citizen or lord, the peasants are in extreme wretchedness."

After the monks, with the lay brothers, had brought a waste into cultivation, it was their custom to let the lands for a certain number of years, generally from six to twelve, to free peasants. The tenant usually delivered a stipulated quantity of different grains, rapeseed, wax, butter, cheese, pigs, and so much money rent, called *voorlyf (prælivium)*. The horses, oxen, cows, sheep, and what else was required for cultivating the farm, belonged partly to the tenant and partly to the monks. The price of the cattle, &c., sold was divided between landlord and tenant, care being taken that the stock should be kept up. In this way the convents in the *Kempen* of Brabant shared with the farmers from the fourteenth to the seventeenth century.

It would appear from documents which have come down to us, that farms in Belgium 400 years ago were fully as productive as at present. We have a comparison of a farm, *Ten Eynde*, in 1410 and 1789. From an extract from the lease of the farm in 1410, it paid 60 veertels (about 30 bushels) of rye, 45 veertels (22 bushels) barley, 1 sack rapeseed, 4 pounds of wax, 2 fat hogs, 12 ells of linen, 12 golden Peters of rent; money to be laid out in common 3 Peters; held in common 6 horses, 2 oxen, 10 cows, 12 fat oxen, 66 sheep of from six to twelve years old.

In 1789, the same farm, with some small additions, was let for 60 veertels (30 bushels) rye, 22 veertels (11 bushels) oats, 12½ veertels (6¼ bushels) barley, 5 veertels buck wheat, and 142 guldens current money, the cattle belonging altogether to the farmer. The corn rent is less in 1789 than in 1410. The other articles are thus estimated:—

Rapeseed....................	2	florins.
2 pounds wax.................	4	„
2 fat hogs	50	„
12 ells linen................	6	„
12 gold Peters (the Peter being equal to 6 florins)................	72	"
Total..............	134	florins.

Besides, as from the common stock of cattle, &c., every year, there would be sold at least 1 ox for 60 guldens, 1 cow or beeve for 30 guldens, 1 horse for 100 guldens, and sheep for 25 or 30 guldens, the share of all which accruing to the landlord would be at least 100 guldens yearly, it is clear that the farm yielded much less in 1789 than in 1410.

It is stated that when the farms suffered from war, fire, or other calamities, which frequently occurred, the religious houses never allowed the peasants to lose heart, but proceeded with the same zeal as they had displayed when they first brought them into cultivation to restore them to a proper state. They rebuilt houses, cottages, stables, barns, and sheds, and whatever else had been destroyed, and allowed in such cases the farmer to sit rent free till he was in a condition to pay. One of the writers, to whose diligence we are indebted for many curious details, M. Heylen, formerly archevist of the Abbey of Tongerloo says :—

"I have seen in an old rental of the year 1592 these words:—'Colonus N. hoc anno nihil dabit, quia tenetur aperire terras ad culturam idoneas, et ante hace mala temporis coli solitas, et dominus dabit illi het zaeyt goet en mest (Farmer N. will pay nothing this year, because he is to bring into cultivation lands fit for culture, and which were in cultivation before the late calamities, and the lord will give him the seed and dung).' In another of the year 1587, I saw the following :—'Colonas N. habebit culturam *ter Locht* ad medutat em crescentium, salvo quod dominus dabet illi het zaeyt goet voer 6 bunderen lands liggende noq om op te broken.'"

With such kind and considerate landlords, who supplied their tenants with seed and manure, and forgave them their rents when times were bad, we can hardly be astonished that Belgium should have long been cultivated like a garden.

It is exceedingly difficult to overturn the prosperity of a country which has long been under a good system. It appears, however, that the Belgian farmers soon had cause to regret the French conquest of the country, and the transference of the estates of the Church to the State. The French functionaries extorted from the farmers large sums for the renewal of their leases, and raised the rents to such a height that bankruptcy in many cases followed :—

"The convent of Corsendouk, and the Throon at Grobbendonck, have already," says Thys (1809), "assumed quite a different appearance. Those who saw those places before the change would hardly know them again. And what shall I say of the inhabitants, whose sorry appearance and mournful accents sufficiently testify the difference between their former and present condition ?"

It would appear that these religious corporations did not require to be told that property had its duties as well as its rights. They did not, when a calamity befell the land, contend that they themselves should be exempt from it, and that the burden of supporting their suffering tenants should be thrown on others.

But I must reserve for a future day some further details respecting the history of Belgian cultivation. —Chronicle.

WASTE LANDS.

BY A BERKSHIRE FARMER'S WIFE.

There is a wise saw, inferior to none of our terse old sayings in pith and truth, "Take care of the pence, the pounds will take care of themselves ;" and upon this proverb we found our present remarks, The crying sin, the great error of the body politic, is waste, waste, waste ! "Waste in the kitchen, waste in the hall ;" and, among our farming brethren, waste particularly in their land. Persons of even the very least tendency to a fearful disposition must, at times, we think, contemplate with anxiety the rapid increase of our population, and—in the present season of defective crops in especial—look with alarm to the feeding of so many millions of human beings. Hosts of succedania are proposed for the failure in the potatoes, &c.; but no writers, it appears to us, go to the source of amelioration, and urge men to cultivate the enormous quantity of land now lying waste.

Thousands of our fellow-countrymen, we fearlessly assert, could be amply provided with food if all the uncultivated bits, corners, useless lanes, wide ditches, double hedgerows, &c., in and about every farm were brought into use. We say nothing of the innumerable numbers of acres, now lost to every good purpose, under the names of greens, commons, game-preserves, heaths, downs, plains, &c. These are the "*pounds ;*" and we hope the wisdom of legislation is turning its attention to the glaring iniquity of allowing so large a proportion of this magnificent country to remain lost to its inhabitants. *We* are contented to "*take care of the pence*," and point out the waste in minor portions of this invaluable soil.

When we contemplate the rapid, insatiable increase of railroads, and reflect on all the additional miles of ground which they throw out of cultivation, being aware, too, that all the old high (as well as secondary) roads which these gigantic ways have superseded are overgrown with weeds, lying worse than useless, desolate and dreary, and that continuous districts of the country are thus completely lost, we feel more and more the magnitude of the recklessness, supineness, or ignorance—(and neither should attach to the government of such a country as ours)—which is in authority over us.

But not even high roads, nor railways, with the superfluity of soil which is devoted to them and to their stations, are now the object of our writing; we still aim but to take care of the *"pence."* Many a little makes a mickle," says the proverb of our careful brethren of Scotland; and *we* should do well to act upon it.

One of the causes that enables the vast empire of China to maintain its innumerable population is the wise economy of its land, and the cultivation of every available foot of ground; and this not only on the surface, but beneath the waters: the bottoms of the canals and rivers, tanks and ponds, are made to bear crops of edibles peculiar to their situation. In our over-populated country, on the contrary, many acres in the neighbourhood of every town and village bear nought but luxuriant crops of nettles, thistles, docks, &c., weeds the most useless, the most subversive of neatness and good husbandry to a farmer. It is waste of time and wages to employ people to exterminate weeds in the midst of crops, when borders of waste lands, many feet in width, surround those fields; which wastes are stocked with plenteous granaries of seeds, which the winds will scatter among his cultivated land. Well may it be said, "One year's weeding saves seven years' seeding." Every farmer ought to know this old truism: but how seldom is it acted upon! With the exception of a few celebrated farms, too rarely do we see a neat, trim homestead, that bespeaks the thriftiness and activity of an intelligent owner.

We would that we could instil a portion of our anxiety for the cultivation of waste lands into the breasts of competent persons, so that the scandal might be removed from this extravagant agricultural population, and that the poor might be made to rejoice in the comfort which would result to them from permission being granted that those idle acres which meet our eye on every hand be made over to the industrious working classes, contiguous to each portion of land.

It is a melancholy sight to journey over those once noble roads—the high road from London to Bath, for example—and see them curtailed in their fair proportions to a narrow strip in the middle of two wide grass and weedy lines many feet wide, devoted to no earthly purpose. During the days of bygone travelling, crowds of coaches, eighty or ninety in the twenty-four hours, rattled gaily along these magnificent roads—there was barely space and verge enough for the multitudinous traffic; but now that the gigantic iron-way has superseded them, it is a melancholy and depressing sight to witness the change that has come o'er the spirit of the land, and the observer grieves and wonders where the alarming waste will cease.

To return to the "pence." There are nooks and corners, we repeat, on every farm, which are now not only useless to mankind, but absolutely sources of annoyance, being abandoned solely to crops of weeds. If the landlords or tenants be rich enough, in the remuerating profits of the land, to be able to afford that so much of it lie idle, well and good; there should be no outcry, no murmuring on their part, at the hard times, while any soil remains uncultivated. And if they think it beneath their dignity to take into use all their portions of waste ground, let them place the soil at the option of their labourers. Many a sack of potatoes, turnips, &c., would be gladly raised by their industrious retainers during the many hours that are squandered in sheer inoccupation; habits of industry would be fostered, good conduct rewarded, kindness evinced, and a reciprocity of the most desirable feeling would be established.

In what respect have we over-rated benefits that would result from the cultivation of waste lands? we hope and believe them to be understated; and if so it becomes a grave accusation against every farmer if he allow an evil to continue, having had it pointed out to his notice. If it be a worthy act to make two blades of grass grow where only one had existed, it would be surely a more meritorious action to gladden the hearts of our dependents; and the cost being so trifling—nay, the boon to them would be costless to their employers—the merits, though lessened, renders the act one of imperative duty.

ISLE OF THANET FARMERS' CLUB.—Monthly Meeting, November 24; Mr. Manser, of Dumpton, in the chair. The subjects for discussion were—"The cheapest and most efficient mode of threshing corn," and "The comparative advantages of ploughing with two, three, or four horses," both of which subjects were most ably argued by many, but more particularly by Messrs. Manser, Bradley, and Smeed, their excellent secretary.

Upon the first question it was resolved, "That although it may sometimes be convenient to use a threshing machine, yet it is by no means the most economical mode of performing the work, nor can its general use be recommended, particularly in localities where straw is saleable."

Upon the second question it was resolved, "That it is not advisable in the common ploughing of land in this parish (St. Peter's) to use less than three horses in each plough; that in some cases, where the land is in excellent condition, the season favourable, and the cattle good, two are sufficient; but that in most cases four horses may be used in each plough with advantage, particularly on large farms: and further, it is the opinion of this meeting that there is more frequently a waste of horse power in other operations connected with husbandry than in ploughing."

ON THE FARMING OF CAMBRIDGESHIRE.

BY SAMUEL JONAS.

REPORT TO WHICH THE PRIZE OF FIFTY SOVEREIGNS OFFERED BY THE ROYAL AGRICULTURAL SOCIETY WAS AWARDED.

In attempting to write a report on the farming of the county of Cambridge I feel the difficulty of the task I have undertaken, and how truly it may be said that practical farmers are not qualified to convey to others their opinions and sentiments in the clear and concise manner so necessary to engage attention; for, although very extensively engaged as a tenant-farmer in the cultivation of land, I feel myself unable to write clearly on that business in which my whole time is occupied. I must trust, however, to the public to overlook the style, and attend to the practical information I may indite.

Cambridgeshire is a purely agricultural county, no manufactures being carried on in it; so that the whole of its population may fairly be said to be agricultural. This population in 1841 was as follows:—Males, 81,611; females, 82,848. Total population, 164,459.

The county contains about 536,313 acres of land. Mr. Vancouver states, that in 1794, 112,500 acres were unimproved—fen, common, and sheep-walks; but Mr. Gooch writes, in 1806, that full 63,000 acres of this waste were then cultivated. Therefore, presuming that 63,000 acres have been broken up and cultivated for half a century, yielding an annual produce of £4 per acre, we have an increase of wealth thus added to the state within the above period of fifty years, of £12,000,000 from this land, or an annual increase of produce worth £252,000. I am not able to point out the annual increase of produce on the old cultivated parts now, as compared with the annual produce in 1806, but it must be to an extent that would not easily be credited, in consequence of the whole county being enclosed, with the exception of four or five parishes, and having been rendered doubly productive by improved systems of cultivation. And as this county is purely and exclusively an agricultural one, I hope it will not be deemed irrelevant to this subject if I point out how the breaking up and converting this waste into productive land, by thorough-draining the clay district, draining and claying the fens, and the improved system on the light land district, has created such a demand for labour, as to have absorbed the amazing increase of our population since 1801, when the population was only 89,364; while in 1841 it had increased to the extent of 164,459, being an increase of 75,113 in the period of forty years. This increase has found employment in agricultural pursuits, or as tradesmen, mechanics, and artisans, in supplying the wants of those engaged in agriculture.

In 1806, by Mr. Gooch's Report, it appears that we had about 49,500 acres of uncultivated waste land, which are now reduced, according to the best information I can obtain, to about 10,000 acres, 5,000 of which are summer lands, mown or fed, but subject to floods.

The soil of the county of Cambridge has, on the east, a substratum of chalk, being a continuation of the chalk formation of Essex; which, cropping out at Ickleton, Meldreth, Royston, Newton, and Gog-Magog hill, near Cambridge, passes on by Newmarket to the county of Suffolk. This chalk formation extends from Royston into the heart of the county—to Melbourne, Shepreth, Newton, and Shelford. At Cherry Hinton, Burwell, and Swaffham, the lower chalk formation crops out; and here we find splendid land of a soft soapy nature, excellent for wheat. The whole of this chalk formation is covered with diluvial deposits of sand, gravel, loam, tenacious clays, and various other strata, either in beds uninterrupted for considerable space, or in every variety of admixture.

The western side of the county, adjoining Huntingdonshire and Bedfordshire, consists of a brown diluvial clay at Gamlingay, resting on the lower greensand, which crops out in the village of Gransden; and here also the Oxford clay makes its appearance. At Orwell-gap we find an outlying bed of chalk; and at Madingley-hill we have another. These are quite separate and detached from the great range of chalk-hills forming the north side of the London basin.

The brown diluvial deposit at Gransden rests on the lower green-sand; at Longstow, &c., it rests upon the galt; at Coton, on the chalk-hill; at Madingley, the galt crops out on the north side, and then the Oxford clay forms the substratum. At Haddenham the lower greensand crops out; and as you descend towards Cottenham Fen you lose this, and the Kimmeridge clay makes its appearance; at Denny Abbey the lower greensand again appears. Crossing the river Cam towards Swaffham, you have the galt, which continues to Swaffham. Here we find some splendid land on the lower chalk formation; and on the eastern side of Swaffham the upper chalk crops out. This chalk deposit is of various thicknesses: at Saffron Walden, near the borders of the county of Cambridge, the late lamented Mr. Jabez Gibson bored to the depth of 1001 feet, and did not get through the chalk.

The northern part of the county consists of low flat fen land, with a deep deposit of vegetable matter resting on the Kimmeridge and Oxford clays. That portion of the fens abutting on the blowing sands of Norfolk is of the worst description, containing a large portion of sand and white particles of chalk. I am indebted to Mr. Deck, of Cambridge, for two sections of the soil of this county, which I have annexed.

The principal rivers are the Cam or Granta, and the Ouse: the latter river is navigable from Cambridge to Lynn, in Norfolk, to which port large quantities of the grain-produce of this county hitherto have been sent by this navigation; but it will soon be a question whether the corn-produce will not in future travel to London by the railroad.

The southern and central part of the county, extending from Ickleton to the north side of Newmarket, is light land, consisting of chalk, sands, tender loams, and gravels.

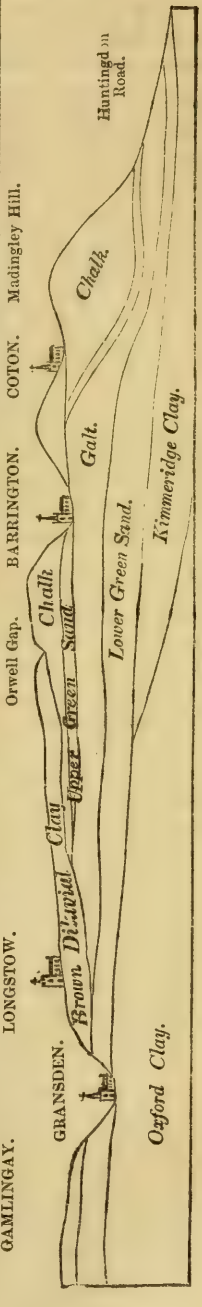
The eastern side of the county, adjoining parts of the counties of Essex and Suffolk, up to Chevely, near Newmarket, is heavy clay land of various qualities, nearly the whole of which district requires draining.

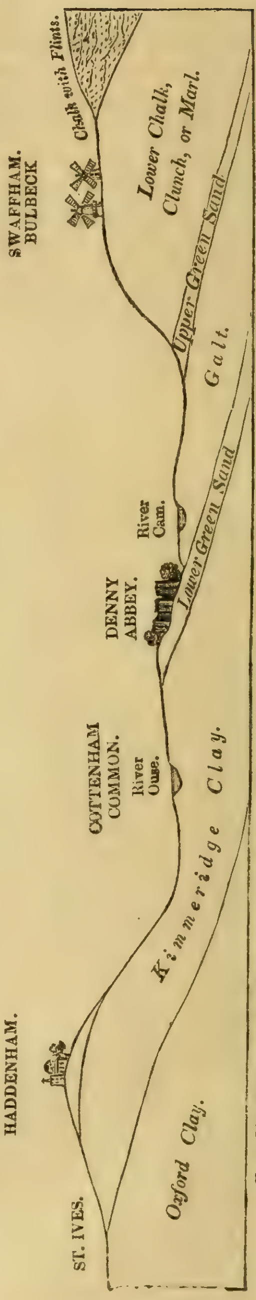
The western side of the county, adjoining Bedfordshire, Hertfordshire, and Huntingdonshire, consists of a tough tenacious clay, of little value on the hills; but the flats are good, strong, deep, staple lands.

In the northern part of the county the Isle of Ely is situated, which consists of the fen district, an accumulation of vegetable deposit resting on the fen-clay.

I will divide the county into four districts, and treat of the system of farming, carried on in each, by itself.

Few counties, if any, have improved more in cultivation than Cambridgeshire has lately done. All the open common-fields have been enclosed (with the exception of five or six parishes), and instead of a system of cropping so exhausting to the land as a fallow and two white-straw crops in succession, with other men's flocks of sheep eating up your food and preventing improvement, we now see the land farmed on the four-course system—the best that can be adopted, unless on very fine land. Large flocks of sheep (not barely kept in existence, as heretofore) are fattened with corn and cake for the London markets, thus enriching the land and increasing its productive powers. In the farm-





From Haddenham to Swaffham by Denny Abbey.

yards and sheds we now find beasts fattening on corn and cake, &c., raising large quantities of rich and valuable manure to be carried back to the land again, to stimulate and renovate her for greater exertion, when she will, with much more gratitude than mankind generally evince, exert herself to repay, with interest, the kindness and attention shown her. But formerly, in these yards you found only a few straw-fed cows nearly starved to death, and verifying the old adage, that "if an animal eats straw, it voids straw." Comparing the present system with the former, it is astonishing to mark the increased wealth our present improved system brings to the state; not only thus largely increasing the national wealth, but also giving full employment for our labourers, which is the only means of producing a happy and contented peasantry: and, if not out of place, I would wish to draw the attention of the landed proprietors and my brother farmers to the great benefit to themselves and their country that must follow the full employment of our labourers. It is the bounden duty of owners of landed property to see that all who are willing to work have the means of obtaining an honest livelihood, as it is the duty of the farmers to provide them with such means. If this principle were fully carried out, it would tend more to improve the social system and strengthen the framework of society, than any other steps that can be taken. And so long as the occupiers of the soil receive remuneration for the employment of their skill and capital, so long are they bound to strain every nerve to produce sufficient food for a largely increased and fast-increasing population. Now, much as the produce of this county has been increased (and the increase, I admit, is great), still I feel no hesitation in saying that a wide field is yet open before us; and although on many farms improvements and high farming have been carried on to the full extent that can be done with safety to the tenant, yet other farms and districts are as yet badly cultivated. I should like to ask to whom is the credit due for past improvement? Why, to the energy, zeal, and perseverance of the tenant farmers, who by the judicious application of capital have rendered vast tracts of comparatively barren land productive. But this can only be done under the security of long leases and good faith between landlord and tenant; for if the tenant, even under the security of a long lease, has, by a very considerable outlay of capital, permanently improved his farm, greatly augmenting its productive powers, and the landlord, at the expiration of that lease, takes unfair advantage of the tenant's improvements by demanding a largely increased rent, surely no one need be surprised if the tenant farmers do not fearlessly carry on those permanent improvements to a greater extent.

I shall now proceed to treat of the system of farming carried on in the light land district, which commences at Royston, on the south-west border of the county; and at Ickleton, on the south-east, running in a northward direction beyond Newmarket to the border of the county of Suffolk, and in an eastern direction to Linton. The western ends of the parishes of Balsham, West Wratting, Weston Coleville, Carlton, Brinkly, Westly, Dullingham, and Stechworth, all abutting upon the Newmarket and London road, are light, tender, weak lands, consisting of diluvial deposits of sands and gravels on chalk; whilst the lands round the villages, and in an eastern direction, are heavy clay and mixed soil lands. On the western side of the district we include part of the parish of Guilden Morden, and Odissy, Litlington, parts of Bassingbourne and Kneesworth, Meldrith, Melbourne, Shepreth, Foulmire, Foxton, Newton, Hauxton, Harston, Trumpington, Cherry Hinton, Bottisham, Swaffham, Burwell, to Fordham. In the five last-mentioned parishes we find a large portion of the soil to consist of a good deep, soapy, white loam, lying upon chalk or clunch. This is the lower chalk formation, and is capable of growing large crops of wheat; in fact, it is as fine wheat land as I ever saw. The great objection to this soil is, that it poaches when feeding off the turnips with sheep; but with our improved plan of cutting the turnips this great difficulty is obviated. The rest of this district consists of a portion of chalk land, some very thin-skinned, hungry gravel, and sand, on a dry, thirsty, walling-stone. Near the rivers and brooks we have occasionally moory and black sand on a gravelly bottom or subsoil, full of springs; some small, tough, tenacious clay spots, mixed with a deposit of fine chalk and sand, all of which require draining, and most of which have been drained. A part of the parish of Melbourne, and a small part of the parish of Foulmire adjoining, are of a similar description to the white lands of Burwell, &c., which lie in a low situation, and are extremely valuable and productive with judicious management. It is on this description of soil that a few years ago the much-prized seed wheat, called the Burwell wheat, was grown. The whole of this district is farmed on the four-course system, with very few variations. Writing a report on the farming of my own county, and being personally acquainted with most of the best farmers residing in it, I feel it would be inexpedient to treat of any one's farming in particular. I shall, therefore, only speak of the system and course of cropping pursued, and not of individual farming. The cropping generally pursued is—

First year: fallow for turnip, rape, or mangold-wurzel.

Second: barley.
Third: seeds, tares, or peas.
Fourth: wheat or oats.

First Year.—Fallow.

The manner of preparing land for turnips, &c., pursued by our best farmers, is as follows:—As soon as any of the wheat lands are cleared in harvest, to commence ploughing them up on those parts intended for Swedish turnips and mangold-wurzel, first taking care to have the wheat mown or reaped sufficiently low to allow of ploughing immediately after the crop is carried, without having to wait for haulming the stubble. This land, as soon as time will allow, is again ploughed across by some, in large flat works; by others, in the manner we term striking, or back-bouting. This is done by turning one furrow to the land, and in returning to turn over this furrow, and the furrow or earth on which it is laid, so that it lies all in gatherings for the frost to enter and pulverize it. As soon as the weather is fine and dry, these lands are dragged across with a harrow, called the Staffordshire harrow, which is certainly the best implement I ever saw for getting out couch-grass or root-weeds. Those who have had Finlayson's harrows have discontinued using them, and prefer the Staffordshire harrow, which requires four horses to work it. A set of common harrows follow the Staffordshire, then a light roll, followed by another set of common harrows, then a set of one-horse, light, jingling harrows. The couch and roots are all thus brought to the surface, and then picked up by women and children, and burnt. These operations should only be carried on when the land is so thoroughly dry that the dust will fly about; and it is a complete waste of horses' time to do such work at any time when the land is not perfectly dry. Many farmers collect the burnt ashes, and mix with bones or guano, and drill with the turnip or rape, for which purpose they are very valuable. But unquestionably the good they may do in this will not repay for the previous exhaustion they had caused to the land. I have seen some farmers drill in burnt couch-ashes mixed with bones, and giving the land a good dressing; but yet they had so imperfectly cleansed the land from the couch-grass, that by the time it came round for fallow again an abundant supply of couch would be afforded for producing ashes for the same purpose. I consider when the land is fallowed it should be thoroughly cleansed from all couch-grass, &c.; for, in fact, every weed that grows extracts as much nourishment from the soil as would produce an ear of corn. It is the sandy and gravelly soils which are so much subject to couch-grass. On the chalky soils, so subject to charlock, this plan of striking on to bouts will be found the most effectual manner of causing the dormant seeds to vegetate in the spring. And here I must admit I am quite ashamed of my county; for, notwithstanding its most excellent farming in many parts, we still continue to be disgusted in the spring by witnessing whole fields of barley as yellow as saffron from the charlock when in blossom; whereas by strict attention for a few years, *never allowing a head to seed,* they might be, as I have known them to be by many of my friends and neighbours, *completely eradicated.*

After all the couch and roots have been thus destroyed, and the few annuals allowed to vegetate, another good ploughing is given, the land being first marked out into proper-sized lands, and in the direction intended for it to lie. We thus have the first, second, and third earths of the fallow, ploughed each time in a different direction to the preceding one. This earth, after lying a few days, according to the dryness of the weather, but not long enough to get hard and cloddy, is then rolled down and harrowed, making a fine tilth for the annual weeds to vegetate in. The dung is then carted on the land and spread, and immediately ploughed in; and here too much care cannot be taken in having the dung in good order, and well shaken and broken in pieces in spreading, so as to be well covered by the plough. Some of our farmers set the dung on the preceding earth, and drag it out before the last earth is given with the Staffordshire harrow. It is by this plan better incorporated with the soil, and less exposed to the action of the air; and some few of our best farmers have adopted the Northumberland plan, by putting them on a ridge; but the plan has not been followed by many, as it is generally considered, on our *dry, thirsty* soils, that we do better *on the flat.* On land in the least tenacious and approaching to clay, I consider the ridge plan advisable; but not on our very dry soils. The turnips are then drilled with about three or four pounds of seed per acre of Swedes. Skirving's improved Liverpool is the sort now generally sown, as they produce a greater weight per acre, and are of a good quality—two very great essentials in a turnip crop. On the white or chalky soils the Swedes are drilled about the last week in May; on warmer soils, about the 11th of June. All the early sown have been the best this year.

Where the land is dunged for turnips, many of our best farmers also apply a dressing of light compost, consisting of bones mixed with burnt weeds or coal-ashes. The writer of this report generally pays about £60 annually for wood-ashes, which are collected in the winter, and mixed with bones and burnt ashes; and although he fattens a great number of beasts on cake, &c., for the purpose of raising rich farm-yard manure, he never drills an acre of turnips or rape without a slight dressing of bones and ashes, guano, or rape-dust; and this on about 400 acres annually. I feel bound to state that every experiment I have made with guano, or seen made by others, has answered my most sanguine expectations. Nearly in the centre of this turnip district we have two very extensive and most excellent bone-mills, situated at Duxford and Whitlesford, belonging to Mr. Charles Thurnall; and I feel I shall not be out of place in stating him to be the son of the late and ever-to-be-lamented William Thurnall, than whom no man ever was more beloved and respected whilst living, or more deeply lamented and regretted when dead, by the whole body of farmers in the county of Cambridge. The demand for bones has so increased of late years, that they have advanced in price from 15s. to 23s. per quarter; still the large importations and the more general use of guano have not only checked their advance, but slightly lowered the price; and I am induced to hope that, from the beneficial results I have seen from the use of sulphuric acid in dissolving bones, and by using a less quantity per acre, we may still further reduce them.

As soon as the turnips are sufficiently old they are harrowed across with an iron harrow, made expressly for that purpose, with two rows of teeth, which parts and thins the turnips without smothering them up, as is the ease with the common harrow; the turnips are then either horse-hoed or flat-hoed by hand, costing about 2s. 6d. to 3s. per acre; they are then set out singly, each hoer having a boy or girl following him to part and pull up any he may have left, so as to leave them single. And farmers will find that too much attention cannot possibly be paid to this part of the business, to see that each turnip stands singly, and that they are not left too thick; as neither large turnips nor a great weight per acre can be grown without plenty of room between the plants, so as freely to admit the air. Some drill them 17 inches from row to row, others 21 inches. The advantage of having them 21 inches is, that in horse-hoeing them the horses walk between the middle rows of plants, but at 17 inches they are obliged to walk on the middle row of plants, which is a great objection. The plants are left rather nearer each other when drilled at 21 inches. In about three weeks' time they are again hoed by hand, to see that they are all left single, and to stir the earth and cut up what few weeds may be found. Our lands are subject to rye-grass, and if not kept well attended to in fine weather, and in the early stage of growth, cannot be kept thoroughly clean afterwards. But the turnip crop should be kept as clean as a garden, not allowing a weed to make its appearance.

About one-fourth or one-fifth of the turnips are pulled and carted into the yard, to be consumed by beasts eating oil-cake and meal. The greater portion of those which remain are then consumed on the land by fattening sheep, eating cake or corn. Many will suppose that with such high farming great crops would be produced; but this district is generally of so poor and hungry a nature, that without such high farming scarcely any crops would be produced. The natural value of a large portion of this district is, comparatively speaking, nothing without high farming; and the increased produce that has been grown since the various parishes have been inclosed is truly wonderful.

The readers of this report can easily picture to themselves the great improvement that must have taken place by the highly improved system of farming at present carried on with so much spirit, as compared with that thus described by Mr. Gooch, in his Report on this county in 1806, at page 97—"A farmer states, that he thinks fallows should lie whole all winter, even if intended for turnips, and that the first ploughing should not be later than May." Many Swedes are now *sown* in May. At page 146 he states, "The cultivation of turnips was much confined in the county, owing to so great a part of it having been open field, the system of cropping which, and the flockmaster's right of going over the whole fallow field, precluding it;" and "that turnips do not succeed on chalks." The writer of this report has seen on chalks as good Swedes as on the red lands, and had this year much better Swedes on his white land than on his red. I should think in Mr. Gooch's time the turnips went off (as he states) for the want of manure to make them grow, as I find only muck and fold were then used, and those of a bad description; and the seed was generally sown broadcast—in a few instances only were they drilled; and one person is named as using light compost; a Mr. Shepherd, of Chippenham, at that time used eight bushels of rape-dust per acre, with the drill, for turnips. At page 147, Mr. Gooch states, "Hoeing twice; but as the art is not well known by the inhabitants, the work is done by persons who travel the country for that purpose, and who make great earnings. It cost a farmer in the neighbourhood of Wimpole 25s. per acre, in the year 1803, for hoeing his turnips by his own people, who would not take them by the acre, but did them by the day, and, it was thought, wrought hard." The price now, for hoeing twice, is about 7s. or 7s. 6d. per acre. Large breadths of rape are grown, which do not require sowing until the beginning of July, or to the middle of that month. This gives an opportunity of cleaning any portion of the fallow shift that has become foul; and it is generally admitted that better Swedes are grown by changing the shifts, letting Swedes succeed the rape and white turnip, and so on alternately; and in fact this point cannot be too much attended to in every course of cropping—changing of soil and seed. The practice of cutting the turnips for sheep is much on the increase. Some pull all their turnips by about Christmas—that is, those that are intended for fat sheep; those required for early feeding are well cleaned, and the tops and tails cut off; they are thrown into heaps of about 20 to 30 bushels, covered with a slight coat of straw or haulm, and a few moulds. This costs, for cleaning and heaping, independent of the covering up, from 6s. to 7s. per acre. Another plan, adopted for those for late feeding, is to draw four drills right and left, thus clearing the space: the plough then opens a double furrow, and about seven rows of the turnips are put in this furrow, and with the plough covered up with four furrows, two on each side the turnips; this is done for about 3s. to 3s. 6d. per acre, besides the cost of ploughing; these rows should then be looked over, and, with a shovel, a little earth put over any portion not well covered up with the plough. These are ploughed out in the spring, cleaned, and thrown in heaps ready for cutting for the sheep. Another plan is to pull them, and take only the leaves off, and heap them, and cover with straw and earth, and clean them as required for use. Others heap them in small heaps just as pulled up, and cover with straw and earth. By some they are pulled and set upright on the ground, close to each other, in a round bed, and the edge of the outside row covered with a few moulds of earth. In bad, sharp weather a little haulm or straw is scattered over the tops. Each plan has its advocates; but the great secret in keeping them is *not to cover them up too close, as they are sure to heat and rot if they have not sufficient air*. Less damage will be sustained from the covering being slight than when well covered up; the top of the heaps should have no earth put on them, so as to admit air.

The land intended for mangold-wurzel is twice ploughed and scarified, the same as the turnip-land, and put on to the bout or ridge in the autumn, then dunged in the spring. These ridges are then split down, rolled with a very light roll, the seed either drilled or dibbled. The mangold is stored for stock ewes, fat sheep, and beasts, and not used till late in the spring, bearing in mind that a careful attention to provide sufficient food of this kind for the spring enables the farmer to keep off his seeds until they are sufficiently advanced to carry his stock on well. Some farmers have a portion of the turnips carted on to a piece of fallow which has a plant of self-sown trefoil, or white clover, it having been seeded when in the seed-shift the previous year to the wheat crop. These turnips are either ploughed into furrows, or clumped up in about 30-bushel heaps, great care being taken not to have the tails cut off, and only just the leaves taken off, not cutting into the crown of the turnips, and then covered with straw and earth. Mangold is also clumped in a similar manner, for the purpose of feeding with sheep in the spring. This plan has two advantages—it enables the farmer to get off his barley land a week or two earlier, and to keep off his seeds a week or two later; and these are two objects that cannot be too much attended to by occupiers of light land, for by sowing late on our turnip lands we suffer considerably in our crop of barley, and by being under the necessity of turning out on our seeds before they are got sufficiently a-head, we suffer for the remainder of the season, and can scarcely get a full fair bite again. Many sow a warm, well sheltered, quick-growing piece of land with rye and the early Essex winter tare mixed, two bushels of rye and one bushel of tares per acre. This is used for the ewes and lambs in the spring to eat with turnips and mangold carted on to the sides of the field in the autumn, and clumped ready for the spring.

I feel bound, in justice to an agricultural implement maker of this neighbourhood, to state that he has succeeded in making an apparatus for dropping bones and other light composts with turnips, and which is easily applicable to any common compost-drill. It was invented by that intelligent and clever agricultural implement maker, R. Maynard of Whitlesford. Several pieces of turnips were dropped with it last year and the preceding one; I dropped with it this season and the last about 60 acres, and am bound to speak well of it. The compost is dropped regularly at 14 inches from heap to heap; a prong or fork covers up the bones, &c., a light coulter with the seed follows, and a small parcel of seeds are deposited over the drop or heap of bones; thus having a few moulds between the bones and seed, the turnips are not dropped opposite to each other, but diagonally.

The liberal prize of twenty guineas offered by the excellent president of the Saffron-Walden Agricultural Society (Lord Braybrooke) was this year awarded to a piece of Swedes dropped with Maynard's drop-drill; and the successful competitor had to contend against seven of the best turnip-farmers of the district. Several of our farmers last year tried charcoal broken for turnips, but not with sufficient success to induce them to continue the practice.

The sort of sheep generally kept a few years ago were the white-faced long-wools; but downs, or short-wools, have increased considerably of late years, and are now generally kept. Probably their increase is owing in a great degree to our having in this county one of the first and most justly celebrated breeders of Southdown sheep in existence, Mr. Jonas Webb, to whom this county, and the country at large, are so much indebted for the spirited manner in which he has improved the breed of this truly valuable stock of sheep; and the extraordinary high average price for which he has for so many years continued to let such large numbers, is strong evidence of the estimation in which his blood is held by the best breeders of Southdowns and the public in general.

I have been credibly informed, that not a very great many years ago broken-mouthed wether sheep have been actually purchased for fattening; but now the lambs are put to high feed early, are wintered with corn and cake on the rape and turnips, and are made quite fat at the age of 14 to 16 months. weighing more per quarter, I will answer for it, than the old broken-mouthed whether did when made as fat as the system then pursued would do. On most farms a flock of breeding ewes is kept, the wether lambs of which are fatted, being shorn once, and sold when at the age of 14 to 16 months; these, after the rape is all consumed, have turnips cut into troughs, and, I feel confident, the plan of cutting turnips for sheep wants only to be tried by those who even now object to it, to be by them most readily adopted. As soon as the fleeces are taken off the backs of the hoggets, they are sent to the London market.

Second year—Barley.

As the turnips or rape are consumed by the sheep, the lands are clean ploughed for barley. Some have of late been in the habit of striking the lands on to bouts, and after lying some time for the frost to pulverize, they are scarified across and ploughed again on the flat in the spring. But I do not think the practice is attended with sufficient success to justify the expense. It is a well known fact, that ploughing light land does not increase its fertility. I do not so much object to this plan on early-sown rape, as it prevents the stalks growing through the interstices of the ploughed furrows, which is often the case when the land is only ploughed once on the flat, and particularly if done by bad ploughmen. The lands in the spring are well harrowed, and drilled with from three to four bushels of barley per acre.

The varieties generally sown are Chevalier, Potter's, and the Nottingham Long Ear: the latter sort has extended much of late. A set of light harrows follows, to cover the seed. The small seeds are sown with either a wide light drill or a hand-barrow; this is done by many at the time of sowing the barley, and by others soon after the barley is up, harrowing the seed in with a very light set of jingling harrows with wooden teeth. Some people object to sowing the seeds the same time as the barley, but by so doing we are sure to secure a plant of seeds, which is of the greatest importance on this description of soil; for without a good plant we cannot ensure a good plant of wheat. The objection to this early sowing is, that the seeds are apt to get up too much in the barley, and in a wet harvest prevent its drying so rapidly, thus causing some delay in the carting. I agree that on the heavy clay land it is not advisable to sow thus early, as the above objections bear more strongly on such land; lying, too, in small fields, and not so much exposed as in our more open part of the country, the seeds, especially red clover, grow more luxuriantly on the clays than on our dry sterile soils. But on the latter description of land, with very large open fields and no hedge-row timber, every breath of air comes over the swarths and dries them. The slight danger and loss thus sustained in a wet harvest is, in my opinion, more than compensated by the safety and security we feel in regard to our plant of seeds. I consider the two great maxims to be adopted by the occupier of light land are, first, to obtain the heaviest crop of turnips he possibly can, at the least expense; this secures a crop of barley: secondly, to secure a good plant of seeds, which will ensure a good plant of wheat.

The plan of not sowing the seeds mixed is extending, as it is found the lands are getting "clover sick." Many of our best farmers now sow red clover only once in 16 years, getting the seed-shift into the following rotation:—1st, white clover; 2nd trefoil; 3rd, peas or tares, fed off or seeded; 4th, red clover. Thus only can we now obtain good crops of red clover.

The quantity of red clover sown per acre is from 15 to 20 lbs.; of white clover, from 12 to 20lbs.; of trefoil, from 25 to 30 lbs. per acre. This district is a fine barley country, sending to the large malting towns of Bishop-Stortford and Ware vast quantities of the very finest description of malting barley.

Third year—Clover, Peas, or Tares.

Some of the clovers are dunged in the winter for mowing for hay; the rest generally sheep-fed. Some of each variety are left for seed by some farmers, and it is desirable to do so to a certain extent, not so much in consequence of the return as for the purpose of enabling us to give a winter's employment to men with large families; the parents threshing or cobbing the straw, the children being employed in rubbing out the seed on what is called a clover-rubber, which is made about 6 feet long by 3 feet wide, and the bottom made with tin plates full of holes punched inwards, so that the rough side is like a nutmeg-grater, only the holes considerably larger. In this district a portion of the trefoil is left for a crop, and if got well in fine weather, the straw is very useful for the winter foddering of horses instead of hay; and in this district, where so little grass-land is found, and that not of a good quality. it proves a very useful substitute. As soon as the harvest is over, and that portion of the fallow intended for Swedes and mangold ploughed up, they commence ploughing the seed-layers for wheat, and this is done as shallow as possible, and kept well rolled down with a heavy roll after the ploughs. Some use a drill-roll, with four horses; I believe it is impossible to get the lands for wheat too solid on these dry light soils.

Fourth year—Wheat.

The land having been well rolled down, it is now well harrowed, and the seed drilled with from 2 to 3 bushels per acre of wheat, as we are obliged to sow thus thick particularly on the dry chalky hills. Those parts of the layer that are neither dunged nor folded have generally from 3 coombs to 2 quarters of rape-dust* per acre, drilled in with the seed. Some have lately tried nitrate of soda sown as a top-dressing, but do not continue the practice.

This district being surrounded by tracts of heavy clay, backward land, the labourers from thence, at the time of year the wheat is ready for the sickle, flock into it in large numbers, so that it is no uncommon thing to see a man's whole crop of wheat cut down in four or five days. I have set about 300 men to reaping in one day. The barley and oat crops are put out to the men of the district, who are bound to cart and stack the wheat. The practice of mowing wheat has much increased of late years, and it will, in my opinion, extend, as the practice of early autumnal fallowing increases. The reaping of wheat generally costs from 7s. to 10s. per acre, with beer, the latter price being given to have it cut close to the ground.

The wheats on many of these dry chalky soils are very apt to lose plant in the spring. On this description of land many farmers have their flocks of store ewes driven over the wheat after it is finished drilling, and tread the land down as close as possible; but this should not be done in very wet weather: for in the year 1842, which was a very wet season, during and for a long time after sowing, much of the wheat, from being trodden down in the wet, and great quantities of rain falling afterwards, did not vegetate: it was, as it were, hermetically sealed, and thus deprived of the action of air and light: large quantities of the seed lay and rotted without any appearance of vegetation.

But few cows are kept in this district for dairy purposes, as it contains but a very small portion of grass lands, and this only on the banks of the Granta or its tributary streams.

The descriptions of cattle fatted are of various kinds. The short-horns, Herefords, a few Devons, occasionally a few Welsh runts, and polled Galloway Scots: none do better than this last sort for feeding loose in yards; but even when kept loose in yards they should always be tied up three times a day, so that each bullock has its own share of food, as you will generally find some masterful hungry bullock will get much more than his share, and if fed high will consequently get off his appetite for some days. They are fed with turnips, mangold, cake, and corn.

A neighbour of mine, and one of our best farmers, fed last year, in consequence of the low price of wheat, his beasts with boiled wheat; the beasts did remarkably well, and became excellent meat.

A landed proprietor, Mr. Cotton, of Hildersham, who has been growing the Gold of Pleasure, had the oil extracted at the mill, and cakes for feeding made with the refuse. He has fed his beasts with it this winter; they have done well with it, he informs me, and he has used the oil for his own domestic purposes: it burns well, gives a good light, and has no offensive smell. I hope he will furnish our Society with a full account of the results.

The Second District

Is the heavy land district on the eastern side of the county, adjoining the counties of Essex and Suffolk, and running to Chevely, near Newmarket, consisting of part only of the parishes of Balsham, Wratting, Weston, Carlton, Brinkly, Westley, Dullingham, and Stretchworth; these parishes about the village and on the eastern side are heavy land: the boundary of these parishes is long and narrow, running down to the Newmarket road, so that nearly all the land lying on the western side of the village is light land; all the villages adjoining the counties of Essex and Suffolk are heavy lands, requiring hollow-draining. I shall now proceed to treat of this district as distinct from the heavy land district on the western side of the county, as it is, in my opinion, much better managed, particularly as relates to draining. It is, with very few exceptions, farmed on the four-course system; it is all well hollow-drained, and, generally speaking, well farmed. The parishes of Horseheath, Castle Camps, and Sheedy Camps have a fair proportion of good grass land.

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* Rape-dust drilled in with wheat appears to be most efficacious in preserving the plant on those light lands where it is apt to die off towards the end of winter. A striking instance of this occurred on my own farm this year. On some poor land out of condition, where three bushels of wheat had been sown to the acre, with various manures and with dung, the ground was almost bare in March, excepting on one bout of the drill, where I found rape-dust had been used, and there no loss of plant had ensued. I mention this case, because the evil of losing the plant of wheat upon such light land is a severe one, and because the proposed remedy, rape-dust, is not an expensive manure.—PH. PUSEY.

First year.—Fallow.

The lands of this district, being heavy and requiring draining, are generally ploughed into stetches containing eight furrows, so that, in drilling, the horses walk in the furrows: thus are avoided the treading and poaching so injurious to heavy land, which is the great fault in the management of the western district, for there they have the land all on high backs, and from one to two rods wide. The plan pursued by the best farmers of this district is, after wheat or oats, the land coming for fallow, the old furrows are opened by a pair of horses; then, with three horses abreast, the ploughman turns a furrow on to the edge of each of the furrow-slices thrown out of the old furrows, thus leaving in the middle of each land a baulk, containing two furrows, which the ploughman then splits: thus the ridges, or lands, are made one yard wide; the four furrows thus ploughed out of the middle of the stetch then lie two furrows right and left, lapping on to the furrow-slices thrown out of the old furrows; they are then called three-furrow ridges, as each ridge is thus made one yard wide with three furrows. As soon as the land is quite dry in the spring, these lands are struck down by going one bout on each land; this plan stirs that portion of the ridge that was not removed the previous earth; they are then well harrowed, and the charlock and needles, &c., allowed to vegetate; again harrowed; then the land is ploughed across on large wide lands with three horses, one going before two; and when done in hot dry weather (and it is a sign of good husbandry in this district never to plough the land in wet weather after winter, as the treading and poaching of the horses' feet do more injury than all the after-ploughing can rectify), the practice of ploughing the land very deep for this earth has considerably increased of late, and from my own observations I cannot believe it possible to plough too deep. The utility of ploughing deep on all retentive soils must be evident to all, for if the soil be only ploughed shallow, in very wet weather it gets unfit for vegetation, the water becomes stagnant, and soluble matter in the soil is either washed out or locked up, from being so thoroughly soaked as to exclude the air; and when it gets dry, it is as hard and solid as bricks for burning. In either case it is almost impossible for any plants to vegetate properly, the soil being at one time wet and soft, and at another too dry and hard. But when the soil is artificially increased by deep ploughing, the rain gradually sinks down the whole depth of the furrows into the substratum thus moved, and from thence into the hollow drains; and in hot, dry summers, the deep-ploughed ground will hold, by capillary attraction, a much greater supply of moisture for the nourishment of plants. Thus deep ploughing drains off the water during heavy rains, and supplies the means of healthy vegetation at all times. It is found by experience that the deeper land is ploughed for fallow, the sooner the water percolates through the soil into the drains. The depth of the staple by these deep ploughings is also increased. After this deep ploughing, the lands are dragged with a heavy crab-harrow; in about three weeks ploughed back again, a good depth, with three horses; again crab-harrowed and harrowed with common harrows; then with a double-breasted plough the land is marked out into lands of the exact width of the drill, and the uniform size of each land is preserved by a marker or piece of wood being fastened on to the beam of the plough by a bolt going through the end, so as to allow its being turned over at the land's end; at the end of the marker is a small iron bar, sharpened at both ends, each point being about 2 feet 6 inches from the end of the marker; at the end of the marker is a chain attached, which hooks into the end of the horse's whippletree. This marker is by the ploughman turned over at the land's end, and hooked in the end of the other whippletree, the ploughman returning to the mark previously made by the marker.

These lands are then ploughed with two horses, and one more ploughing is given soon after Michaelmas, the last two furrows being ploughed with two horses at length, to prevent any treading of the ploughed land. Water-furrows are then drawn. In the spring no more ploughing, but a large iron skim covering the whole stetch is used, which cuts the loose land previously pulverized by the frost. A set of harrows follows, then the drill; then a set of light harrows covers the seed. The land then lies like an onion-bed. How far preferable this plan to the old-fashioned one of ploughing the land in the spring, and sowing the barley broadcast! not a horse's foot by this plan treads on the land, all going in the furrows. The portion of land intended for seeds is sown after the barley is up, and either rolled or harrowed in with a very light set of harrows, some merely using a hurdle with a few bushes drawn through the bars. Red clover is taken once in eight or twelve years; beans, peas, and tares fed off on the rest of the seed-shift.

On this soil the manner of drawing the drains for hollow draining is to have them with a fair fall for the water; and they are generally, I might say always, drawn slanting across the lands or ridges, and running in parallel lines to each other at distances varying from 4 to 7 yards; but the nearer the drains to each other, and the deeper they are put in, the drier the land, and the greater the advantage to the occupier. The drains are drawn by some with a common foot plough; by others with a very large plough made for that purpose, with larger and much deeper mould-boards or breasts. The ploughman first draws out four furrows, leaving a baulk of two furrows, which are thrown out as deep and as wide as possible; then a furrow is taken out of the bottom open furrow: thus we get a depth from 8 to 10 inches. The mains are then drawn out at the ends of the common drains, and an opening to every six or seven score rods of common drain is made into the open ditch, which should be well cleaned out before operations are commenced. The drainer begins by necking in these parts of the main drains, which is done with a common trustle-spade about 10 inches deep and 6 wide: two spits deep are dug out with this common spade: each drainer has a boy with a pail, and a half-pint tin mug fixed in the end of a stick, and with this he pours a few drops of water on the edge of the spade, which materially assists the workman in cutting his ditch out clean. This applies more to the lower spit, which is cut out with a narrow draining-spade,* about 1½ inches wide at the lower end, and 12 to 16 inches deep, The moulds left are all cleaned out with a bent scoop or hoe. The workman, as he proceeds in his main, necks each common ditch as he comes to it: these mains are dug 2 inches deeper than the common drain. The drains are then filled up with bushes and straw or turf cut from the fens in the Isle of Ely; and some are done by ramming the lower spit of clay on to bridges drawn along the bottom of the drain. When filled up with wood and straw, great care should be taken in the manner of putting the bushes and wood in, so as not to meet the current of water: the wood is pressed in the drains by crotch stick, and the side boughs and crooked parts have a slight cut made with the bill, so as to make them more readily yield to the pressure of the stick: this prevents the breaking and putting in of the sides of the drains. A little straw is scattered on the top of the wood, and pressed on it, and by the best farmers great care is taken in filling the earth in: the lower spits are taken up with the hand and laid upon the straw, and trod down with the foot. The objection stated to filling in with the shovel until this is done is, that the sides of the furrows of the surface-soil roll in first; and as soon as the straw and bushes decay, this, not being of so adhesive a nature, falls to the bottom of the ditch, and creates an impediment, and at such places the ditches are apt to blow up. But by the tough clay spits being put in first, they settle down, by treading at first, and afterwards by pressure, close over the straw; and when the straw and wood decay, form a compact arch, leaving a hollow space for the water to flow. The plan pursued when filled up with turf is by the workman going forwards and laying the turf in the drains: the ends of the turf should touch each other; these are pressed in with the foot of the drainer as he proceeds, and the ditches being cut tapering, getting narrow below, they act as a complete wedge, and leave a hollow space below of about 5 inches deep. These pieces of turf are cut about 14 inches long.

The method adopted in ramming is to make bridges consisting of four pieces of oak plank, about 5 to 6 inches deep, and nearly the size of the drain, not fitting too tight, but just filling up the space; these pieces of plank are jointed with iron hinges or joints; the lower spit is rammed on them. The bridges are then drawn forward by a lever attached to a chain fastened to the bridge or plug; earthern pipes or tiles are put in the mouth of each eye or neck running into the open ditches.

Third Year—Clover, Beans, Peas, or Tares.

The red clovers are fed with sheep on those portions intended for seed up to the 1st of June. It is not considered safe to feed them later, as it injures the crop, The part intended to be mown for hay is mostly covered with a mixture of dung, and borders and scourings of ditches mixed up together; this is carted on the clover layers in the frost, and well harrowed in with a bush-harrow.

The lands intended for peas and beans are ploughed in the winter, so as to be well pulverized by the frosts; early in the spring the peas are drilled. Many plough later, and with a hand-barrow deposit the peas on the bottom of each alternate furrow. The beans are either drilled or dibbled. Peas, about 3 bushels per acre sown;

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* This narrow spade, or lance-headed tool, though probably it has been used for at least a century in the eastern counties, I have found superior to any other for laying inch-pipes in a tenacious clay free from stones. As compared with the long-handled tool used in my own neighbourhood, it enables one workman to do the work of two, and with greater ease. The use of it is peculiar, as two side-cuts are made and then a cross-cut, but is easily learnt, and the tool is a favourite with workmen who know it.—Ph. Pusey.

beans, from 2 to 2½ bushels per acre. The beans are hoed three times, and I have seen field after field kept as clean as a garden.

Fourth Year—Wheat.

Wheat succeeds both clover and beans and peas, but the wheat after peas is much more hazardous. Both the bean and pea land should be sown later with wheat, and not quite so much seed per acre sown as when succeeding clover.

Mangold-wurzel and Swede turnips are occasionally grown in this district, the land selected for that purpose being generally land lately converted from grass to arable, or a piece of mixed soil land. No good can be done by growing turnips generally on the heavy clays of this district. I will here mention a plan pursued by a proprietor occupying his own estate; and it is a plan worthy the consideration of those farming this description of land.

The plan alluded to is to plough the land after wheat on the eight-furrowed ridge, twice if necessary, during dry weather in autumn or winter. These ridges are in April split with the plough; the manure then spread and ploughed in, as on the Northumberland system. These ridges are then not disturbed until the time of sowing the turnips, when a skim is used, about 3 feet wide, with a sharp edge, attached to a pair of gallows, like a Kentish plough, thus cutting under the manure of every ridge. This operation destroys all annual weeds; the earth is in a beautifully pulverized state; the seed drilled upon it grows well and with rapidity. Good turnips are thus produced, for feeding on the land in dry weather, or for drawing off. I think if turnips are grown on heavy land they should always be drawn off, and the land sown with wheat; as I believe wheat succeeds better after turnip or mangold than either barley or oats on such land. This district contains a fair portion of good grass land. Several spirited farmers have lately been rearing suckling calves; they get the best short-horn calves they can, brought up out of Northamptonshire, which are fed with milk and boiled linseed, &c., having a warm shed to go into, and a run into some rich young grass; as soon as they can eat it they have a little linseed cake allowed, are so kept the summer, are well wintered on cake and turnips, turned out to grass the following spring, having cake every day, and are then fit for the butcher, being made fat about the age of 20 months to 24 months.

No one can travel through this district and the heavy clay district on the western side of the county without being struck with the superiority of the system here pursued over the other—both being heavy clays and requiring draining. In the eastern district every field being ploughed in straight lands of one uniform width to fit the drill, all treading and poaching are thus avoided. The great advantages also of cross-ploughing the fallow, and when fresh drains are required, of being able to put these drains across the former old ones, are not to be lost sight of. In the western district we have nearly all the lands on the high backs, scarcely any of them straight lands, but varying in width from 5 to 10 yards; and when the land requires fresh draining, the drains must be put in the same furrows as before, and in the same direction; no deep cross-ploughings can be given, but always ploughing in the same direction. I cannot but think that the day is not far distant when we shall find the example now being set by Mr. Franks, of Childerly (who manages Colonel Calvert's estate), in getting the lands gradually ploughed down and sized into straight uniform lands generally adopted.—Journal of the Royal Agricultural Society.

(To be concluded in our next.)

POTATOES.

It is to *fashion* that the potato owes its general cultivation and use. If you ask me whether fashion can make *a nation* prefer one sort of *diet* to another, I ask you what it is that can make a *nation* admire Shakespear? What is it that can make them call him a "Divine Bard," nine-tenths of whose works are made up of such trash as no decent man, now-a-days, would not be ashamed, and even afraid, to put his name to?

It is the fashion to extol potatoes, and to eat potatoes. Every one joins in extolling potatoes, and all the world like potatoes, or pretend to like them, which is the same thing in effect.

In those memorable years of wisdom, 1800 and 1801, you can remember, I dare say, the grave discussions in Parliament about potatoes. It was proposed by some one to make *a law* to encourage the growth of them; and, if the bill did not pass, it was, I believe, owing to the ridicule which Mr. Horne Tooke threw upon that whole system of petty legislation. Will it be believed, in another century, that the lawgivers of a great nation actually passed a law to compel people to eat pollard in their bread, and that, too, not for the purpose of *degrading* or *punishing*, but for the purpose of doing the said people good by *adding to the quantity of bread* in a time of scarcity? Will this be believed? In every bushel of wheat there is a certain proportion of *flour*, suited to the appetite and stomach of man; and a certain proportion of *pollard* and *bran*, suited to the appetite and stomach of pigs, cows, and sheep. But the parliament of the years of wisdom wished to cram the *whole* down the throat of man, together with the flour of other grain. And what was to become of the pigs, cows, and sheep? Whence were the pork, butter, and mutton to come? And were not these articles of human food as well as bread? the truth is, that pollard, bran, and the coarser kinds of grain, when given to cattle, make these cattle fat; but when eaten by man make him lean and weak. And yet this bill actually became a law!

That period of wisdom was also the period of the potato mania. *Bulk* was the only thing sought after; and it is a real fact that Pitt did suggest the making of *beer* out of *straw.* Bulk was all that was looked after. If the scarcity had continued a year longer, I should not have been at all surprised if it had been proposed to feed the people at rack and manger. But, the *Potato!* Oh! What a blessing to man! Lord Grenville, at a birth-day dinner given to the foreign ambassadors, used not a morsel of bread, but, instead of it, little *potato cakes;* though he had, I dare say, a plenty of lamb, poultry, pig, &c., all of which had been fatted upon corn or meal, in whole or in part. Yes, sir, potatoes will do very well along with plenty of animal food, which has been *fatted on something better* than potatoes; but when you and I talk of the use of them, we must consider them in a very different light.

The notion is, that potatoes are *cheaper* than wheat *flour.* This word *cheap* is not quite expressive enough, but it will do for our present purpose. I shall consider the *cost* of potatoes, in a family, compared with that of flour. It will be best to take the simple case of the labouring man.

The price of a bushel of fine flour, at Botley, is, at this time, 10s. The weight is 56 lbs. The price of a bushel of potatoes is 2s. 6d. They are just now dug up, and are at the cheapest. A bushel of potatoes which are measured by a large bushel, weighs about 60lbs. dirt and all, for they are sold unwashed. Allow 4lbs. for dirt, and the weights are equal. Well, then, here is toiling Dick with his four bushels of potatoes, and John with his bushel of flour. But, to be fair, I must allow, that the relative price is not always so much in favour of flour. Yet, I think you will agree with me, that upon an average, five bushels of potatoes do cost as much as one bushel of flour. You know very well, that potatoes in London, sell for 1d. and sometimes for 2d. a pound; that is to say, sometimes for 1*l.* 7s. 6d. and sometimes for 2*l.* 15s. the five bushels. This is notorious. Every reader knows it. And did you ever hear of a bushel of flour selling for 2*l.* 15s? Monstrous to think of! And yet the tradesman's wife, looking *narrowly* to every halfpenny, trudges away to the potato shop to get five or six pounds of this wretched root for the purpose of *saving flour!* She goes and gives 10d. for ten pounds of potatoes, when she might buy five pounds of flour with the same money! Before her potatoes come to the table, they are, even in *bulk,* less than 5lbs. or even 3lbs. of flour made into a pudding. Try the experiment yourself, sir, and you will soon be able to appreciate the *economy* of this dame.

But, to return to Dick and John; the former has got his five bushels of potatoes, and the latter his bushel of flour. I shall, by and by, have to observe upon the *stock* that Dick must lay in, and upon the stowage that he must have; but, at present, we will trace these two commodities in their way to the mouth, and in their effects upon those who eat them. Dick has got five bushels at once, because he could have them a little cheaper. John may have his *peck* or *gallon* of flour: for that has a fixed and indiscriminating price. It requires no trick in dealing, no judgment, as in the case of the roots, which may be *wet,* or *hollow,* or *hot;* flour may be sent for by any child able to carry the quantity wanted. However, reckoning Dick's trouble and time nothing in getting home his five bushels of potatoes, and supposing him to have got the *right* sort, a "*fine* sort," which he can hardly fail of, indeed, since the whole nation is now full of "fine sort," let us now see how he goes to work to consume them. He has a piece of bacon upon the rack, but he must have some potatoes too. On goes the *pot;* but there it may as well hang, for we shall find it in continual requisition. For this time the meat and roots boil together. But what is Dick to have for supper? Bread? No. He shall not have bread, unless he will have bread for dinner. Put on the pot again for supper. Up an hour before daylight, and on with the pot. Fill your luncheon-bag, Dick: nothing is so relishing and so strengthening out in the harvest-field, or ploughing on a bleak hill in winter, as a cold potato. But, be sure, Dick, to wrap your bag well up in your clothes, during winter; or, when you come to lunch, you may, to your great surprise, find your food transformed into pebbles. Home goes merry Dick, and on goes the pot again. Thus 1,095 times in the year Dick's pot must boil. This is, at least, a thousand times oftener than with bread and meat diet. Once a week baking and once a week boiling, is as much as a farm-house used to require. There must be some fuel consumed in winter for warmth. But here are, at the least, 500 fires to be made for the sake of these potatoes; and, at a penny a fire, the amount is more than would purchase four bushels of flour, which would make 288lbs. of bread, which at 7lbs. of bread a day, would keep John's family in bread for 41 days out of the 365. This I state as a fact, challenging contradiction, that, exclusive of the extra *labour* occasioned by the cookery of potatoes, the *fuel* required in a year for a potato diet would cost, in any part of the kingdom, more than would keep a family even in baker's bread for 41 days in the year, at the rate of 7lbs. of bread a day.

John, on the contrary, lies and sleeps on Sunday morning till about 7 o'clock. He then gets a bit of bread and meat, or cheese, if he has either. The mill gives him his bushel of flour in a few minutes. His wife has baked during the week. He has a pudding on Sunday, and another batch of bread before the next Sunday. The moment he is up, he is off to his stable, or the field, or the coppice. His breakfast and luncheon are in his bag. In spite of frost he finds them safe and sound. They give him heart, and enable him to go through the day. His 56lbs. of flour, with the aid of 2d. in yeast, bring him 72lbs of bread; while, after the dirt and peelings and waste are deducted, it is very doubtful whether Dick's 300lbs. of potatoes bring 200lbs. of even this watery diet to his lips. It is notorious, that in a pound of clean potatoes there are eleven ounces of water, half an ounce of earthy matter, an ounce of *fibrous* and *strawey* stuff, and I know not what besides. The *water* can do Dick no good, but he must swallow these 11 ounces of water in every pound of potatoes. How far *earth* and *straw* may tend to fatten or strengthen cunning Dick, I do not know; but, at any rate, it is certain that while he is eating as much of the potato as is equal in nutriment to one pound of bread, he must swallow about fourteen ounces of water, earth, straw, &c.; for down they must go together, like the Parliaments' bread in the years of wisdom, 1800 and 1801. But, suppose every pound of potatoes to bring into Dick's stomach a sixth part in nutritious matter, including in the gross pound all the dirt, eyes, peelings, and other inevitable waste. Divide his gross 300lbs. by six, and you will find him with 50 lbs. of nutritious matter for the same sum that John has laid out in 72 lbs. of nutritious matter, besides the price of 288lbs. of bread in a year, which Dick lays out in extra fuel for the eternal boilings of his pot. Is it any wonder that his cheeks are like two bits of loose leather, while he is pot-bellied and weak as a cat? In order to get half a pound of nutritious matter into him, he must swallow about fifty ounces of water, earth, and straw. Without ruminating faculties, how is he to bear this cramming?

But Dick's disadvantages do not stop here. He must lay in his store at the beginning of winter, or he must buy through the nose. And, where is he to fine *stowage?* He has no caves. He may *pie* them in the garden, if he has one; but he must not open the pie in frosty weather. It is a fact not to be disputed, that a full *tenth* of the potato crop is destroyed, upon an average of years, by the frost. His wife, or stout daughter, cannot go out to work to help to earn the means of buying potatoes. She must stay at home to *boil the pot*, the everlasting pot. There is no such thing as a *cold dinner.* No such thing as women sitting down on a hay-cock, or a shock of wheat, to their dinner, ready to jump up at the approach of the shower. Home they must tramp, if it be three miles, to the fire that ceaseth not, and the pot as black as Satan. No wonder that in the brightest and busiest seasons of the year, you see from every cottage door, staring out at you, as you pass, a smoky-capped, greasy-heeled woman. The pot, which keeps her at home, also gives her the colour of the chimney, while long inactivity swells her heels.

Now, sir, I am quite serious in these my reasons against the use of this root, as food for man. As food for other animals, in proportion to its cost, I know it to be the *worst of all roots* that I know anything of; but that is another question. I have here been speaking of it as food for man; and if it be more expensive than flour to the labourer *in the country*, who, at any rate, can stow it in pies, what must it be to tradesmen's and artizans' families in *towns*, who can lay in no store, and who must buy by the ten pound or quarter of hundred at a time? When broad-faced Mrs. Wilkins tells Mrs. Tomkins, that, so that she has "*a potato*" for her dinner, *she does not care a farthing for bread*, I only laugh, knowing that she will twist down a half pound of *beef* with her "potato," and has twisted down half a pound of buttered toast in the morning, and means to do the same at tea time, without prejudice to her supper and grog. But when Mrs. Tomkins gravely answers, "Yes, Ma'am, there is nothing like a potato; it is such a *saving* in a family," I really should not be very much out of humour to see the tête-à-tête broken up by the application of a broom-stick.—Cobbett's Year's Residence in America.

EXPERIMENT ON SHED-FEEDING SHEEP. — The flock of sheep consists of the pure Leicester breed, Southdowns, and half-breds, viz., between Leicesters and Southdowns. Consequently, to test the relative qualities of the Leicesters and half-breds, there were 22 of each kind chosen from the flock, and placed in two separate yards, the size of the yards being 12 yards by 10 yards, including sheds for them to run under during the inclemency of the weather. I must here remark that at the time of folding up they were in a condition that would be called fat, in consequence of which they would not gain so much weight as they might have done had they been in a much lower state when folded up. The kind and quantity of food given to each sheep per day was ½ lb. of linseed-cake, ½ lb. of barley, and as many turnips as they could eat. The following is the exact and monthly weight of each lot, being from the 13th December, 1845 (the time of their being first folded), until the 13th April, 1846:—

Leicesters.					Half-breds.				
Date.	st.	lbs.	st.	lbs.	Date.	st.	lbs.	st.	lbs.
13th Dec....	207	6	Increase.		13th Dec....	207	9	Increase.	
13th Jan....	224	4	16	12	13th Jan....	222	11	15	12
13th Feb....	241	2	16	12	13th Feb....	238	13	16	2
13th Mar....	257	9	16	7	13th Mar....	254	2	15	3
13th April...	270	2	12	7	13th April ..	274	11	20	9
			62	10				67	2
In favour of half-breds			4	6					
			67	2					

It will be observed that the sheep of the Leicester breed increased more during the first months, when it will also be perceived that the half-breds gradually began to increase more, and continued so to do until the time they were slaughtered. It appears from the above tables of weights that the Leicester sheep would for a limited time, on first putting up, gain a greater weight than the half-breds, but if kept for a moderate length of time the half-breds will obtain the lead of weight, and continue so to do as long as it may be the wish to keep them, for I find that when the Leicester breed of sheep has obtained a certain weight, their increase afterwards is but a mere trifle compared with the half-breds, and as far as my judgment and experience goes, I should prefer for general feeding on poor soils the half-breds.

Scafton-farm, Osberton. RICHARD WOODS.
—Gardeners' Chronicle.

AGRICULTURAL DEVELOPMENTS.

The anticipated beneficial effects resulting from the institution of railways to social industry in general, have in no department received more practical confirmation than in connection with that branch of agriculture denominated grazing. From evidence adduced before committees of the House of Commons, and from the unanimous testimony of graziers themselves, the pursuit of this department of farming in Great Britain is, in 1846, attended with profit nearly 20 per cent. superior to that accruing from its cultivation in 1836. The apparent source of this advantage, which, it will be admitted, is a liberal compensation for any imaginary injuries supposed to be sustained by the agricultural community from the introduction of free trade, is the speed, certainty, and cheapness of communication now afforded between the most extensive grazing districts and the chief cattle markets; but it is not alone upon its superiority in a pecuniary point of view that the new system of conveyance upon which this branch of industry is conducted is to be regarded as preferable to the old—the feelings of common humanity are no less interested in the results which have been evinced. An Oxfordshire farmer, on being questioned relative to this subject before Parliament, replied to the effect, that even if the cost of sending his cattle by rail to market were considerably greater than it actually was, it would, nevertheless, be of great advantage to have them conveyed by that means. The cruelty and injury to animals, he said, was formerly beyond all belief. Sometimes the poor things were driven till their feet were sore, and they were sold on the road for what their owners could get for them. He would prefer paying 14s. for transmitting his cattle by railroad, to paying 7s. for the ordinary means of conveyance. Although this statement is by no means an argument in favour of maintaining the present high rate of railway charge, it still sufficiently establishes the fact that considerable advantages have resulted to a highly important branch of national industry. The advantages to the public have been manifested in the improved quality of the meat offered them for consumption; and from present appearances, as railway charges seem destined, before long, to sustain considerable reduction, the expectation may be indulged that the article itself will become proportionably cheap. For many years past the grazing districts of Scotland have supplied the English markets with a large portion of the animal food consumed on this side the Tweed. Within the last twelve months the quality of this food, in various markets in England, seems to have undergone a decided improvement, a circumstance solely to be attributed to the causes to which we have already referred. Situated as the Scotch grazing districts are in parts of the country as yet possessing no railway facilities for the transport of cattle, animals destined for the different markets of England are either conveyed thither by steam-boat or else are driven a large portion of their journey on foot, till arriving at some line of railway leading to the locality at which they are to be sold, their owners take advantage of the facilities of conveyance thus afforded. The meat of these animals when slaughtered is good in proportion to the slightness of fatigue which they have sustained in travelling on foot, and from the many lines of railway which have sprung up within the time already alluded to, ramifying almost every portion of England, the necessity for travelling on foot is now in great measure lessened. The lines now in progress of construction in Scotland, joining with those of England at the borders, and communicating with the grazing districts, will, when completed, be thus of the highest advantage, not only to the rearers of cattle, but also to the consumers. Cattle conveyed from a distance by steam-vessels are almost as much deteriorated as those driven on foot. During the last quarter of a century, large quantities of cattle have been brought to the London markets from the most northern districts of Scotland by this means of transport, but upon their arrival in the metropolis they have been invariably found in an unnatural state, and, according to the best evidence, they always "seem stupified, and in a state of suffering from fatigue."

In the *Railway Register* for October, of which we are just in receipt, there occurs the following note on cattle traffic, which we give apropos to this subject :—Mr. Hyde Clarke reckons the average loss by driving, and consequent saving by conveyance on railway, at 5lbs. per qr. for beasts, or 20lbs.; 2lbs. per qr., or 8lbs. for sheep; and 2½lbs. per qr., or 10lbs. for hogs. This is believed to be a low estimate. Mr. H. Handley, M.P., one of the heads of the agricultural interest, calculates the loss on driving from Lincolnshire to London at 8lbs. in the weight for sheep, and 25s. to 30s. in money for beast. The time for sheep he calculates at eight days for getting up to market, which is equivalent to three or four market days, during which the chances of the market may be much affected. The promoters of the Northern and Eastern Railway, in their prospectus, take the loss, on driving 100 miles, at 40s. for beasts, and 5s. for sheep. When it is considered how many beasts and sheep are driven from a much longer distance than 100 miles, the above data may be taken as a fair average; and they show the propriety of the calculations in the Contributions to the Railway Statistics. Mr. Handley reckons the same amount for loss for sheep—namely, 8lbs., and allows a higher rate for cattle. The Northern and Eastern promoters state the supply of the London market at 150,000 beasts, and 1,500,000 sheep per annum, the saving on which, by railway conveyance, they take at £675,000. The saving might be fairly taken at 40lbs. for beasts; 8lbs. for sheep; and 20lbs. for swine; which would give a gross saving of pounds of animal food on the present number conveyed on railways as follows:—

On	220,000 beasts......	8,800,000 lbs. of beef.
„	1,250,000 sheep......	10,000,000 lbs. of mutton.
„	550,000 swine.......	8,250,000 lbs. of pork.
		27,050,000

This would give a total of 27,050,000lbs., or 11,000 tons of animal food, economized even at the present moment in the infancy of the railway system. It is much to be regretted that no accurate return exists of the quantity of killed meat conveyed by railways, as such information would tend to throw much light on the question of the economy of animal food by railways. There can be no doubt, by the testimony of the cattle salesmen, that the net weight of dead carcases brought up to market is much heavier than it used to be under the old system; and this is the best practical proof that the saving is a real and effective one. The practice of bringing the dead carcases to market has contributed to reduce the extent of cattle-driving as much as the conveyance of the live animals by railway has done; but though we can show the extent of the one operation, we cannot of the other.

ON BURNING CLAY FOR MANURE.

BY WALTER LONG.

To Mr. Pusey.

DEAR SIR,—As you have requested me to write you an account of my mode of preparing a useful manure from burnt soil, and the method of burning, I shall be highly gratified if this communication of a very simple process should be of the smallest use to any agriculturist.

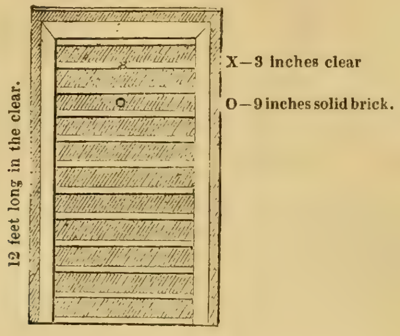
Our soil is a thin, dry, flinty loam upon chalk; and we suffer, unless we have abundance of rain in spring and summer. Everything, therefore, is beneficial to our land that has the property of attracting atmospheric moisture, carbonic acid gas, &c., &c. With this object, the first point is to obtain ashes; those that are burnt in the fields from weeds and grass round the headlands, or from the grubbing of hedgerows, being full of vegetable matter, are the best and cheapest. These, however, can only be burnt in summer; and sooner or later, in farms that are kept clean, the materials are no longer to be found. Yet an inexhaustible supply may be obtained, and employment afforded throughout the winter, by burning clay and strong earth in kilns protected from rain; the only difficulty having been, that many persons, and myself at first, produced a hard substance *more resembling brick-bats than powder*. This difficulty I obviated by (previous to burning) well saturating the soil with water, working it and treading it to the consistency of mortar; for water will separate any particles, however adhesive: and then the fire expelling the water and the carbonic acid gas, leaves the particles previously separated, when burnt, in a state of very fine powder; and if any should not at first be quite separated, it slacks immediately on the application of liquid. Having saturated the soil thus with water, as much as a spade will hold is rolled up to the size of a large cannon ball, and is handed to a man in the kiln, who places it on the bars or the coping of the brick arches over the furnace. He places each ball as he receives it side by side for two or three tiers, one above the other, and then lights the bavins in the furnace. In a short time the balls, wet as they are, become set or firm, and will not run into one another from the accumulated weight, as they would do if thrown in together in a rude wet mass. These tiers of balls are then covered with a layer of small roots or wood (which become charcoal), and then over this wood, the moist earth is laid on, in spits, as loosely as possible till the kiln is nearly full, and finally topped up with turf or rape-roots, or any vegetable rubbish.

If the first tiers of balls be laid on over night, and the fire be kindled about seven next morning, all work of continuous burning may be so forwarded as to enable the men to block up the mouth of the furnace with roots or stools by five o'clock P.M., leave it to burn, and go home; and the next morning the whole will be found burnt out. In this way, there being three kilns, and one lighted every morning, one will be cooling, one will be unloaded and charged again with the balls, and one will be burning out, and so on in rotation. And by burning off two kilns any one day at the close of the week, and leaving them to cool, seven kilns may be burnt in each week, each containing about 160 bushels, and thus 1,000 *net* bushels may be obtained weekly. When the ashes are taken out of the kiln, they are sifted very fine, and made free from stones, chalk, &c., and wheeled to a covered shed, 50 feet long, and there laid out in beds or pools, embanked by themselves all round, about two feet deep; a portable cask and pump annexed then continually brings from various tanks the overflowings of the farm-yards, the liquor from the stables, cow-sheds, piggeries, the house, and the laundry, and discharges it into these beds of fine ashes, which, when they have absorbed the liquor, are covered with a coat of gypsum.

They are then repeatedly turned, and repeatedly flooded, until they have thoroughly imbibed the moisture, and remain fully charged with valuable matter. It is then packed away in another close shed, or store, and then trodden down by men as hard and close as you may fancy guano to lie in its rocky bed; and so it remains piled up to the upper tie-beams of the shed, and covered over with boards and hurdles until dug out with a pick-axe for use. We thus have always a large store of manure ready to drill for turnips, Swedes, and roots of any kind, and a most excellent top-dressing for grasses and meadows; and in the kitchen-garden and flower-gardens it has been found a perfect substitute for farm-yard manure, and less productive of weeds. In its process it heats a good deal, and sends out crusts of saltpetre.

A rough larch shed, roofed with beech boarding, protects each shed and the workmen from wet.

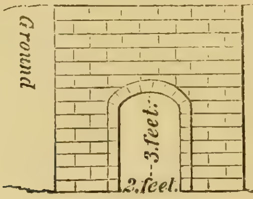
Ground plan of arches and bars bottom of the ashes.



4 ft. 2 in. wide at bottom, and 6 ft. 3 in. wide at the top.

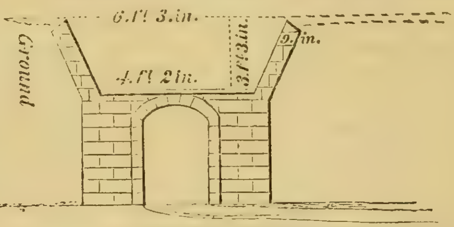
The kilns are built in a dell, so that there is a road on the level of the top of the kilns to load and unload them.

No. 1.
Front view as seen.



6 feet.

No. 2.
Section, if front were removed. Road above to unload.



Road below to heat the furnace and carry away wood-ashes.

Should any stronger stimulant be required for drilling for Swedes, &c., an addition of superphosphate, or guano, soot, prepared night-soil, or, at any rate, powdered charcoal, is easily and readily made to this compost, thus (for the drill) counteracting any excess of moisture.

With a supply of soil or clay from any rough, unproductive spot, with bush faggots or firs, bavins and roots, or old timber stools, and by collecting in tanks all the animal liquor that would otherwise be lost, and then making the ashes the depository or vehicle of valuable liquor, it is not difficult for any one to command annually an immense quantity fo good manure.

If the soil can be obtained near to the kilns, six men could carry on the whole work, and the whole value of the fuel consumed would be about two guineas weekly. Of course the total expense would be greater if the soil is to be carted to the kilns. I have given in the preceding page the measurement and plans of the kilns.

Faithfully yours,
Walter Long.
Preshaw House, Bishops-Waltham, Hants,
June 10th, 1846.

I used this manure alone in 1843 and 1844 for Scotch yellow turnips, and after for rape—both crops were very good. I used it alone for rye-grass and clover, and for meadows, and invariably there was a great difference from where there was none; and again, it was always better where a greater quantity was used, or where heaps had been placed to be spread. The men employed and the neighbours used to point out the spots to me, and the natural growth of white clover and trefoil.

I have found it highly beneficial for oats, the saturated ashes sown thickly after the presser, producing a good crop in the places in which it was applied alone.

In my last year's crop of Swedes I combined with the saturated ashes 3 bushels of bones and sulph. acid, and drilled them on land that was dunged; but the crop was 24 tons per acre on very poor land!

We all know the value of ashes as a vehicle to mix with better things; the only merit (if any in my process) I consider to be the being able to burn it in kilns to powder instead of brickbats, and in the winter under cover, and finding useful employment for surplus labourers in bad weather, &c.; and also suffering nothing to be wasted about a place in the way of liquid, by being provided with a constant receptacle in the ashes, and the combination becoming a sulphate of ammonia, and ever (when plenty in store) good at need, and for any purpose, either by itself or in combination with guano, soot, charcoal, &c.—Journal of the Royal Agricultural Society.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

The first Monthly Council, after the recess, was held at the Society's House, in Hanover Square, on Wednesday last, the 4th of November: present, the Right Hon. the Earl of Egmont, President, in the Chair; Sir Matthew White Ridley, Bart.; Colonel Austen, M.P.; David Barclay, Esq., M.P.; Thomas Raymond Barker, Esq.; Humphrey Brandreth, Esq.; W. R. Browne, Esq.; Colonel Challoner, F. C. Cherry, Esq.; B. T. B. Gibbs, Esq.; C. Hillyard, Esq.; William Fisher Hobbs, Esq.; John Kinder, Esq.; Francis Pym, Esq.; Professor Sewell, William Shaw, Esq.; Robert Smith, Esq.; and Henry Wilson, Esq.

Finances.—Colonel Austen, M.P., Chairman of the Finance Committee, presented to the Council a statement of the Society's accounts to the end of the previous month; from which it appeared that the invested capital of the Society, on the 31st of October last, stood at £7000 stock, with a current cash balance of £1531 in the hands of the bankers.

Potato Disease.—Mr. Pusey, M.P., Chairman of the Journal Committee, transmitted to the Council a report of the adjudication of the first prize of £50, on the foundation of His Grace the Duke of Northumberland, K.G., one of the Vice-Presidents of the Society, for the best Essay on the Remedy for the Potato Disease, and on its treatment in the various stages of planting, growth, and preservation, to Mr. George Phillips, of No. 4, Upper Park Street, Islington; and Analytical Chemist to the Hon. Board of Excise, Old Broad Street, London. Mr. Pusey also informed the Council that a further report would be transmitted in reference to the two other prizes placed at the disposal of the Society by the Duke of Northumberland.

St. John's Day Rye.—The Essays competing for the society's prize on the subject of the St. John's Day Rye, were received and referred to the Journal Committee for adjudication.

Flax Cultivation.—The Marquis of Downshire's liberal offer to add the sum of £30 to that of £20 already voted by the Society, for the best Report on Flax, was unanimously accepted by the Council. The Essays competing for these prizes to be sent to the Secretary on or before the 1st of March, 1847; and the competitors required to state the reasons, general and particular, in favour of extending the growth of flax in this country, along with any considerations regarded as being adverse to the practice; also to explain in detail the most approved methods of cultivating the plant, the best mode of saving the crop, and preparing the flax for market; as well as to state the way in which the whole or any portion of the seed may be saved with the least injury to the fibre, and be most profitably applied by the farmer.

Cottage Tracts.—The Secretary having reported that the whole of the 27,000 impressions of the Cottage Tracts, on Domestic Economy and Gardening, reprinted from the Journal, for private distribution, were disposed of, the Council ordered a further reprint of 3000 copies for the same object.

Wheat and Barley.—Mr. Isaac Taylor, of Monkmoor, near Shrewsbury, transmitted to the Council his opinion on the respective merits of the Wheat and Barley selected for trial at the Southampton Meeting.

General Meeting.—The Council decided that the hour of the General Meeting of the Members on Saturday, the 12th of December next, should be fixed for eleven o'clock in the forenoon; and that the Rooms of the Society in Hanover-square should be thrown open as usual on the evenings of Wednesday, Thursday, and Friday in the Smithfield Club Show week, for the accommodation of those Members of the Society who should visit the metropolis at that time.

Smithfield Club.—Mr. Brandreth Gibbs took that opportunity of laying upon the table a certain number of Prize-sheets connected with the ensuing Show of the Smithfield Club; and also, in order to prevent disappointment, of reminding such of the Members of the Society then present as intended to become exhibiters on the occasion, that the last day of entry and receipt of Certificates for the Smithfield Show would be Saturday, the 14th of November.

Lectures.—Mr. Raymond Barker laid before the Council the joint recommendation of Lord Portman and Mr. Pusey, that the lectures to be delivered before the members at their ensuing December Meeting should be of a different character from those delivered on previous occasions. They recommended that the lecturer should be instructed, not on theoretical grounds of chemical philosophy, or on reasonings derived from the laws of vegetation, to hazard conjectures on the best means of improving the present modes of agricultural practice, but to confine himself to the more substantial and legitimate elucidation of a clear, simple, and striking exhibition of the chemical, physical, and mechanical properties of those elements so constantly referred to under various designations in works on agricultural chemistry, with which practical farmers in general have so few opportunities of becoming familiar by the direct evidence of their senses, and without which experimental illustrations they are precluded from that tangible knowledge of the scientific elements of modern writers, which will enable them to peruse their works with satisfaction or instruction. Mr. Barker further stated that Lord Portman and Mr. Pusey had ascertained that Dr. Ryan would be prepared to give such lectures to the Members of the Society, with the experimental illustrations required, in the Great Theatre of the Royal Polytechnic Institution, granted for the occasion by the Committee of Management, on Wednesday the 9th and Thursday the 10th of December next, at 8 o'clock in the evening, such members being admitted at the private entrance, No. 5, Cavendish-square, by free tickets, to be obtained of the Secretary at the office of the Society. On the motion of Mr. Barker, seconded by Colonel Challoner, this recommendation was unanimously adopted and confirmed by the Council.

Trial of Implements.—Mr. Shelley transmitted to the Council the joint report of himself and Mr. Miles, the Stewards of the Implement Department at the Newcastle Meeting, on the various documents referred by the Council for their consideration. This report was unanimously adopted and confirmed.

Removal of Animals. — Sir Matthew Ridley gave notice that at the next meeting of the Council he should move an additional rule for adoption at the future country meetings of the Society, in reference to the removal of animals generally, but especially of stallions, from their place in the Show-yard, only under such restrictions and orders from the Stewards as will prevent irregularity and confusion, and diminish the chances of personal accidents.

Country Meetings.—Memorials were received from the Mayor and Corporation, respectively, of Leeds, Norwich, and Guildford, inviting the Society to hold its country meeting in their localities; from various railway companies, offering to the Society's exhibitors a free transit for their stock and implements to and from the places of show, on the meetings being held within the district of their lines; and from Mr. Eddison, detailing the circumstances favourable for the holding of the meeting in a given locality. These various communications were received with thanks, and reserved for consideration respectively at the monthly Council in the April of the year preceding that in which the meeting is to be held.

Mr. Shaw gave notice that he should move, at the next Council, "That, as since the division of the country into districts, a liberal subscription to the funds of the Society has been made by the districts respectively, a Committee be appointed to consider the practicability of reducing the expenses of the Annual Country Meeting, and of applying a portion of the subscribed fund to prizes to be competed for by persons residing within the district only."

Letters relating to the alleged unfairness in the shearing of sheep exhibited at the society's meetings, to suggestions respecting the importance of disqualifying fat animals entered for exhibition, and to the appointment of judges, were laid before the Council and referred to the Stewards of the Yard.

Mr. Haigh, the contractor for the Pavilion-dinner at Newcastle, addressed to the Council a letter of thanks for the liberal manner in which they had considered and discharged his claims.

Royal Veterinary College.—Professor Sewell, in performance of the request of the Council at its previous meeting, presented a report of the number of pupils instructed at the college in a knowledge of the diseases peculiar to cattle, sheep, and pigs, agreeably with the intentions of the Society.

Epidemic among Cattle.—Professor Sewell then obtained leave of the Council that Mr. Simmons, the Professor of Cattle Pathology at the Veterinary College, should be allowed to address them on the subject of the disease prevailing amongst cattle.

Mr. Simmons observed that he did not think any benefit could possibly arise to agriculturists by the Society's circulating, as it had been, he believed, proposed, a paper containing instructions for the treatment of cases of pleuro-pneumonia, as it must, he thought, be borne in mind that the early symptoms of the affection were so ambiguous and so little developed, that even veterinary surgeons, long accustomed to the diseases of ruminating animals, sometimes failed to detect the existence of the affection in its earliest and curable stages: consequently the measures recommended would too frequently prove more injurious than beneficial to the interest of the farmer. He did not think that the fatality attending pleuro-pneumonia was so great at the present time as it had been heretofore; many cases within his own experience having been successfully treated, and veterinary surgeons in his opinion had become better acquainted with this and other diseases of cattle since the extended system of instructing pupils had, through the munificence of the Society, been carried out at the Veterinary Colleges; and both himself and his colleagues were most anxious to do all in their power to promote the laudable objects of the Society. He flattered himself that the delivery of a course of lectures—not confined to one class of organs, but embracing the structure, functions, and diseases of all parts of the body—had already been productive of great benefit; and expressed his willingness to furnish to the Council whatever report they might require along with a synopsis of his lectures. He regretted the small number of cattle-patients sent to the College. In his opinion there were many causes for this deficiency, and he feared also some which could not be removed. He begged to suggest that Members of the Society should be informed how much they had it individually in their power to aid the joint objects of the Society and the College, by sending up diseased animals for anatomical examination and illustration in the Lecture Room.

Mr. Barclay, M.P., Mr. Shaw, and Mr. Fisher Hobbs, having then addressed the Council on this subject, Professor Sewell invited the members generally to visit the College, and inspect the arrangements already made for the reception of cattle-patients. He regretted the failure of diseased animals for investigation, which could only be obtained at the market price of butcher's meat; and of the Cattle Infirmary at Islington, which he had taken so much interest and pains in getting established.

Miscellaneous Communications.—Numerous communications and presents made to the Society during the recess were received with thanks, and reserved for further consideration. Among these were Mr. Shaw's present of a Portrait and Memoir of Lord Portman, the late President of the Society, as contained in the "Farmer's Magazine" for the current month; and presents and communications from His Imperial Highness the Archduke John of Austria, Baron Washington, of Munich, the Hon. Edward Everett, Principal of Cambridge University, U.S., the Imperial Agricultural Society of Vienna, the Royal Societies of Munich and Caen, the New York Agricultural Society, Dr. Spurgin, Mr. Falconer, Mr. Charnock, Mr. Dean, Mr. Raynbird, Lady Franklin, Mr. Rogers, C.E , Mr. Parker, Mr. Casella, Mr. Davies, Colonel Moody, Rev. Dr. Stewart, Dr. Murray, Mr. Dickson, Mr. Coxworthy, Mr. Wood, Mr. Salmon, Mr. Gesner, Mr. Broadhead, Mr. Read, V.S., Mr. Iveson, Mr. Drury, Mr. Trimmer, and Mr. Morton.

The Council then adjourned to Wednesday, the 2nd of December.

NEW MEMBERS.

Crawford, Rev. W. H., Haughley Park, Woolpit, Suffolk
Gyles, John, Apley Head, East Retford, Notts.
Horn, Allen, Bridge-street, Sunderland
Knight, Charles, Fern Cottage, Donhead St. Andrew, Salisbury
Masefield, George, Ledbury, Herefordshire
Mumford, George, Briset Hall, Stowmarket
Robinson, James Septimus, Hunter's Hall, Sunderland
Robinson, Thos. Temple, Low-Newport, Sunderland
Scott, Robert, M.P., Stourbridge, Worc.
Williams, Robert, Birchin Lane, London.

THE LONDON FARMERS' CLUB.—MONTHLY DISCUSSION.

A monthly meeting of the General Committee was held November 2; present, Messrs. Aitcheson, W. Anderson, R. Baker, J. Beadel, W. Bell, W. R. Brown, W. Cheffins, G. Emery, W. Gray, W. F. Hobbs, W. Hutley, C. W. Johnson, T. Knight, E. Lewis, T. Oakley, H. Price, W. Purser, W. Rasen, W. Shaw, W. Shaw, jun., R. Smith, R. B. Smith, T. Tyler, and J. Wood; Mr. Baker in the chair.

The election of a secretary in the room of Mr. Thorpe, resigned, was the only business of importance before the committee. There were a great number of candidates, many of whom produced testimonials of the most satisfactory character. The report of the sub-committee appointed to examine the testimonials of the several candidates having been brought up, and the principles upon which that committee had proceeded having been explained, Mr. Henry Corbet was unanimously elected to fill the office of Secretary.

A discussion on "The best and most economical mode of thrashing grain crops," took place at the usual hour.

The Chairman said: The subject fixed for discussion this evening is, "The best and most economical mode of thrashing grain crops." I was not aware, gentlemen, until yesterday, that this question was to-night coming before us; but as it is a matter upon which most of us are pretty well informed, and upon which little can perhaps be said beyond the observations which may arise in the course of discussion, no great amount of preparation was necessary. The point will resolve itself into two heads, namely, the "best mode" and the "most economical mode" of thrashing; and they will be found to be perfectly separate parts of the question; for that mode which is the best is not always the most economical, neither is that which is the most economical always the best (Hear, hear). I will first regard the common mode of thrashing with the flail, the great recommendation of which is that it affords employment for the labourer when there is no other for him, and that by this mode of thrashing there is less waste of straw and chaff. The chaff is also much better when the corn is thrashed with the flail than by other means. These are the chief points which recommend the principle of thrashing with the flail. There are some kinds of grain which cannot be thrashed in any other way than by hand, without injuring it; this is especially the case with barley which is intended to be used for malting; and I know that many maltsters will not buy barley thrashed by machine, or, if they do, only at a considerable reduction in price, as they assert that the action of the machine injures the sprouting powers of the grain (Hear). Whether the opinion they entertain in that respect be well founded or not, I am not prepared to determine; or whether it applies to all machines or not, I cannot say; but there are, no doubt, gentlemen present who will be able to give us some information upon that point. With regard to the economical branch of the question, I think the cost of thrashing varies very little whether we use the hand, or whether we employ horses, or steam, or wind, or water power. So far as my calculations go, I think the cost of thrashing by machinery rather more than the cost of doing it by the flail; but if we take the long period which this mode occupies, and the depredations to which we are liable from the labourer—for, however watchful we may be, we are liable to great depredations in this way—of that fact, we have the evidence of numerous instances in which robbery has been carried on to a great extent without exciting the least suspicion, until all at once the truth has burst upon the conviction of the sufferers. The slowness is a great objection no doubt. At this time of the year, for instance, when all the labourers that can be mustered are wanted for getting in the seed, a thrashing machine becomes absolutely necessary to enable the farmer to obtain a sufficient quantity of corn thrashed (Hear). But then, with regard to thrashing by machinery, I think, so far as I know anything of it, that throughout the eastern counties it would be almost impossible to adopt it with the present arrangement of buildings—that is to say, without extending the buildings; and as the buildings for hand-thrashing are already formed, and machinery is not in general use, I don't know how far it might be advantageous. Our general custom, when we don't use the flail, is to have a portable machine which is taken about from place to place by the hour. There are two descriptions of machine: the horse-power machine; and the hand-thrashing machine, which has lately come into use. The horse-power machines, I think, are very inefficient; and there are very few of them but what injure the straw. Some of them not only injure, but absolutely destroy it, for every marketable purpose; and they, moreover, injure the grain. I have myself lately been thrashing by machine, and I am quite satisfied that the grain was considerably injured. If the machine was not placed sufficiently close, then the grain was not thrashed out of the ear; and, if it was, then the grain became broken. It is a great point that these machines should be so constructed that they shall not break the grain, and yet thrash it out clean (Hear, hear). The machines recently constructed were without rollers; now, he recollected that when rollers were used, the machines thrashed much better than now. It might be that the rollers held the straw long enough to thrash all the grain out. They did not thrash quite so much per day as the modern machines; but, as the latter frequently depreciated the value of the grain from 5 to 10 per cent. and the straw 20 per cent., he thought the comparison was greatly in favour of those with rollers instead of beaters. It must be remembered, also, that in Essex we have a greater redundancy of labour than in other counties; the labourers have not been absorbed by railways and other works in this county as in some parts of England. The employment of horse-labour has in many instances deprived the labourers of their ordinary sources of employment in the winter months; and, in consideration of this state of things, many farmers have discontinued the use of the horse-power machine, and adopted the hand-power machine, by which, with two men, they can thrash from four to six quarters of corn a day, with as much advantage to themselves as when they formerly used the horse-power machine. There is this great advantage attending the use of the hand-machine: that in wet weather you can set a number of men to work at it, and you cannot very well do that with the flail or the fixed horse-power machine. Again, if you want the men to work in the fields, they can discontinue their thrashing at any period; and the hand-machine being placed in the barn, there is no injury done to the wheat by the humidity of the atmosphere; which often, under other circumstances, renders it much depreciated for marketable purposes. This small machine, moreover, is so constructed that it does not break the straw so much as the larger descriptions of machine do. The above few observations are all I have thought it necessary or proper at present to offer, feeling that there are gentlemen present who have had vastly greater opportunities of observing the different modes of thrashing than I have (Hear, hear). The question, however, as set out in the card, is, "The best and most economical mode;" and I certainly hold that thrashing by horse or steam power is the most "economical." But whether it is the "best," is another thing. I think the best is that which is conducted by manual labour; for I have never found any plan to succeed so well as the common mode of thrashing with the flail (that is to say, when you can attend to the men yourself, and see the work well done). But if you cannot do this, why the loss which you sustain, either by their not thrashing out sufficiently, or by their taking part of the grain home with them at night, will prevent its being the most economical mode (Hear, hear). I confess that my corn rises better from the machine than from the flail, although it certainly does not rise in quite so clean a condition (Hear). The greatest of all objections to the use of the flail is, perhaps, the opportunities which it gives for depredation. Having made these few remarks, gentlemen, I shall now leave the question in your hands, hoping you will confine yourselves strictly to the subject before the meeting (cheers).

After a short pause,

Mr. Aitcheson said: I am at all times unwilling that any discussion of this club should flag for want of speakers, and therefore, just for the purpose of keeping the subject alive, I will offer a few observations to the meeting, and I will tell you at once that I have never used either horse power or water power for thrashing, having confined myself to the modes conducted by manual labour (Hear). I do not quite go with the remarks of our Chairman, to the effect that the grain rises cleaner from the flail than from the machine; for I have taken it up and rubbed it, for the purpose of ascertaining, and I have found it more clean from the machine than from the flail. At the same time, I admit that it is our bounden duty to employ the labourer as much as we can (Hear). I agree with our Chairman, in what he says of the advantages of being able to tell our labourers to leave their work in the field in wet weather, and go to thrashing. But when I consider the cost of the machine (and I charge myself with the same amount as any one would be willing to pay me for doing it), I think that flail-thrashing comes as cheap in the end as machine-thrashing. After I have thrashed out the wheat, I have the straw bound too: the men are bound to bind it up in trusses. I put four men, for instance, to work in this way, and I find that they will not bind me more than 36lbs. to a truss, so that they earn me but eighteenpence, while I pay two shillings for it. If, therefore, I take it to market, I must lose a penny per truss. My principle, however, is to cut it up, and feed the cattle with it: in fact, when I come to compare thrashing with the hand-machine and thrashing by manual labour, I find that the former profits me nothing; and straw which has been thrashed by machine will not fetch so much in the market by four shillings as that which has been thrashed by flail (Hear). No one, I think, if he could afford to wait, could do better than employ the labourer to thrash by flail. But there are times and seasons when prices fluctuate, and it becomes the farmer, like other people, to take advantage of the markets; and if he can thrash out four times as much by machine as he can by hand, why of course he is perfectly justified in doing so (Hear). It is a great thing to be able to take advantage of a rise in the markets; but if the employer be an honest farmer, I think he will return to the employment of the labourer as soon as he has done that (Hear). I have sold corn as low as ten or eleven guineas a load, and have been paying men two shillings a day for thrashing; but when I have sold it at 16*l.* a load, I have given them 2s. 6d., because I thought when selling it at the latter price I was justified in so doing. But if we could always wait an unlimited time for thrashing our corn, it would be a different thing. We must recollect, however, that in considering this subject, we have to consider the interests of the whole tenantry of England, and to think how they can afford to thrash their corn. If we could wait, as I before said, I think we should do more justice to ourselves, and give more satisfaction to the labourer. But if I am asked the question, "How are we to take advantage of the markets?" then I at once answer that I admit we must resort to the thrashing-machine (Hear). If I am asked which is the best mode, I reply that the corn comes out more clean from the hand thrashing-machine, but the straw is better from the flail. We must, nevertherless, come to this question at last, "How are our labourers to live?" and in order to apportion the labour to the mouths which have to be fed, we had better use machinery as little as we can, if we consider the general good of society.

After another short pause, in which there did not appear any disposition to extend the consideration of the question,

The Chairman said, I felt quite satisfied that this discussion could not extend to any great length; so much, however, has been tested: it is admitted on all hands that there is very little difference in the cost of thrashing either way. If the men be well looked after, it is as well and as cheaply done by manual labour as by machine. But otherwise the machine has the advantage. At the same time it must be remembered that the horse machine injures the straw, and that it is not at all adapted for thrashing barley. The better way, therefore, is to adapt your means to an end, according to circumstances. If you have labourers on your hands, and have no other or better employment for them, it is very desirable that they should have thrashing to resort to, as in certain seasons the poor man is very awkwardly situated (Hear, hear). I will not, however, pursue the subject further; and perhaps as Mr. Hutley, who was recently to have favoured us with a lecture on the best mode of preparing the land for wheat crops, is now present, he will allow me to propose that we quit this subject, and take up the other (Hear, hear—and No, no, from Mr. Hutley). If that gentleman only tells us the results of his own experience, that will be quite enough for us, and we can follow the subject up at our own discretion (Hear).

Mr. Hutley.—For my own part, I am not a machine-man; on the contrary, all the corn I grow I have thrashed with the flail; and I can certainly speak more in favour of the flail than of the machine (Hear). I think by using the flail I can thrash corn far more economically than by any other means. In fact, I find manual labour the cheapest. With regard to the employment of horse-power machinery for thrashing, I look upon it that the horses can be employed to much greater advantage in other ways; for if you take nine or ten horses away from your farm, for the purpose of thrashing, you don't know what injury may be done to the land in the meanwhile. My conviction is that you can thrash a vast deal cheaper with the flail; and I am satisfied that if you go into the figures of the question, you will find it to be so (Hear). A friend of my brother's has a machine which goes with eight horses, and at the time he erected it, he fancied his neighbours would bring their corn to him to be thrashed; but unfortunately he forgot to make any calculation about the expense of carrying back the straw (Hear, hear). The consequence is, that his corn, which might be thrashed for about a shilling, costs him double that sum (Hear). Now economy is every thing (Hear, hear). To employ horse power just at seed-time, when you want the horses upon the land, will never answer. If you can erect a steam power, then machinery is all very well; but if you cannot, why then it must be injurious to use machinery at all (Hear). In some cases it is found that at certain times we cannot get labour, and therefore it is necessary. For my own part I always protect myself: I never want to go to the labour-market; I always have recourse to my own labourers, because I always have them in my barn; but I know that with many persons it is found difficult to obtain labourers, as, from the new and different modes of cultivation, from the vast sources of employment open to them in the railroad and mining districts, they get away from the old agricultural districts: in fact, they are forced to think and act for themselves (Hear, hear). I shall not longer detain you, gentlemen; but taking all the circumstances of the question into consideration, I am disposed to think that thrashing with the flail, or manual labour, is the best (Hear, hear).

The Chairman.—I think it costs about the same money in one case or the other, namely about three shillings per eight bushels.

Mr. Aitcheson.—You say it costs you about three shillings—does that include binding the straw?

The Chairman.—No: there is a shilling a load more for that.

Mr. Aitcheson.—Then it seems that we Sussex farmers, who are sometimes so laughed at, are paying our labourers more then you Essex farmers? (Hear, and a laugh). Why I am paying at this moment 4s. a quarter for thrashing, and 1s. 6d. a load for binding (Hear, hear).

The CHAIRMAN.—You are not generally paying more than we are for thrashing: I am paying 3s. 6d. at the present time, and there are many persons in different districts who do not pay so much as we pay. But I was speaking of the average cost of thrashing.

Mr. BELL.—I have just been paying for 13 days' labour to one man, who has thrashed and dressed 14 quarters of wheat: that is equal to 32s. or 33s. a week.

Mr. MORTON.—I am quite convinced, with regard to this subject, that the most economical mode is the best (Hear), and the mode which I have adopted is that of doing it by steam engine (Hear, hear). The necessity of having the horses on the land in my farm made steam absolutely necessary. After reckoning five per cent. for repairs of machinery, the cost of coals, and the wages of the men, women, and boys; my cost for thrashing wheat has been about 1s. 3½d. per quarter. The engine consumes 70lbs. of coals an hour, and it takes an hour and a half to get the steam up. I employ three men, five women, and two boys; and with these I have thrashed (and cut up the straw into chaff) 46 sacks of wheat in seven hours and a half (Hear). I have already thrashed 400 quarters, and it would have been quite impossible to do that with the flail. I only thrash when the weather is dry, and it is done as fast as it can be carried into the barn close by.

Mr. AITCHESON.—Where is the corn stored?

Mr. MORTON.—At the end of the barn: it is stacked in two rows of ricks, with a railroad between them.

Mr. AITCHESON.—Is it thatched, pray?

Mr. MORTON.—Oh, yes: it is all thatched; and the men unthatch it as they go on.

Mr. AITCHESON.—In storing it, I suppose you place it in long parallelograms?

Mr. MORTON.—No, it is all placed in round stacks, with the tramway running between them.

The CHAIRMAN.—Mr. Stephens, in his "Book of the Farm," walls them in with rows of brick.

Mr. AITCHESON.—What is the number of acres upon which the wheat is grown in this farm, pray, sir?

Mr. MORTON.—A hundred and twenty. With my steam engine I have thrashed 120 cubic yards of rick (for that is the way to calculate it) and cut it all into chaff, with three men, five women, and two boys; and I sacked all the corn.

Mr. AITCHESON.—How do you find employment for the labourer after so thrashing your corn? Suppose you thrashed 360 cubic feet; after you have so done, what employment do you find for the labourers?

Mr. MORTON.—Why, I have thrashed out 400 qrs. already (Hear, and a laugh).

Mr. AITCHESON.—And were they thrashed advantageously for a tenant farmer, or only as for a man of fortune?

Mr. MORTON.—I am a tenant farmer, and not a man of fortune (Hear, and a laugh); and, with regard to so employing the labourers, I am convinced, or at least half convinced, that it is a disadvantage (Hear).

Mr. AITCHESON.—I confess that when I am paying a man at the end of one week, and am obliged to say to him, "I can't employ you next week," it is always a consideration, and frequently a painful one with me as to where that man will go (Hear, hear).

Mr. MORTON.—My complement is about forty men, and six women (Hear).

Mr. AITCHESON.—Then you have a greater portion of labourers than we have in our neighbourhood, I am ashamed to say (Hear).

Mr. BELL.—I can fully bear Mr. Morton out in all he has said of the advantages of employing the steam engine for the purpose of thrashing; for I have had plenty of opportunities of observing them. The steam engine is very generally used in Lincolnshire; I have followed the same mode as that alluded to, of getting the steam engine up by the side of the stack, and thrashing out the corn. I have thrashed 120 qrs. of wheat in twenty-six hours. One great consideration is the extent of work which can be done without the aid of horses; for the weather being favourable, my horses were during the whole of the time employed on the turnip fallows; another consideration is the saving of expense which arises from not having to take it into the barn: the steam engine is wheeled to the side of the rick, and the work done at once. The expense of carrying the produce of thirty-five acres into the barn is no small expense (Hear, hear). I do not coincide in the objection to machinery which is urged, on the ground that you will deprive the labourer of his employment; the more machinery is used, the more labour will be wanted (Hear, hear). I admit that machinery will not be advantageous in small holdings; but where there is a large quantity it is the cheapest, and wherever I have the opportunity I shall certainly embrace it (Hear, hear).

Mr. FISHER HOBBS.—I am very glad, Mr. Chairman and gentlemen, that this discussion should have taken the direction which it has; for I was afraid it would go forward to the world that this Club was recommending the farmer to go on in the old jog-trot way in the use of the flail (hear). I have always found that those who used machinery as much as possible, and not those who used it as little as possible, as some gentlemen have been recommending to-night, were those who employed the greatest number of labourers (hear, hear, and cheers). There are many advantages in the mode of thrashing by machinery over that of the flail. For we not only get the corn cleaner—decidedly cleaner—but it also gives the opportunity of selecting the most suitable period for thrashing out the corn, and sending it to market. It also gives us the power of thrashing out a large quantity in a short period. Much has been said about the different sorts of thrashing-machines which ought to be used. I know of one machine manufactured by the Messrs. Ransome, capable of thrashing out fifty quarters of wheat per day; in fact, I can cite two instances of this description of machine, (which is of four-horse power, two sets of horses being used), where upwards of fifty quarters of wheat were thrashed daily: and with regard to damage by breakage of the straw, that will not happen with the more modern and improved machines (hear). I am ready to admit the chaff is not so thoroughly separated from the straw by the thrashing machine as by the flail, which, however, is a matter of minor importance at the present day, inasmuch as the straw is now so generally cut up wherever economy of feeding is considered. The argument which was used just now with regard to our not always being able to get labourers for flail-thrashing, I think is one of some force; for it is no doubt true that it often happens that we cannot get men to carry out that operation of the farm. In thrashing with a machine we only want one or two skilful and honest men, upon whom we can depend, to place over the mere casual labourers; in that case we can employ young men, or, as Mr. Morton say he does, even women. But in Essex we cannot employ women; they bring nothing in; they won't work (hear, and a laugh). If you employ labourers in thrashing with a flail, I repeat, you must have skilful men. My observation, however, goes to this, that thrashing by flail is in the majority of cases disapproved of; and I, for one, am decidedly in favour of doing it by machinery, not only on the ground of economy, but on the ground of various other advantages derivable therefrom (hear). I am convinced that, the longer we live, and the greater our experience, the more we shall see machinery applied to agriculture (hear, hear, and cheers).

Mr. Aitcheson.—A great deal of the injury which is done to the corn in the way of breakage, and is attributed to the action of the machines, I have no doubt is caused by the men walking over it with their heavy hob-nailed boots or shoes; and this is easily obviated by making them wear slippers while engaged in this work (hear). I don't think I speak beyond bounds, when I say that the loss which sometimes ensues from this cause is nearly 10 per cent. (hear, hear).

Mr. Morton.—I am quite satisfied that Mr. Aitcheson's notion on this point is correct. In my mode of thrashing I have only two people who can, by any possibility, trample on the corn, that is to say, the woman who lifts the corn into the "chevalier," and the man who takes it from the first machine to the second; and these I make cover their shoes with pieces of sacking, which I think better than wearing slippers (hear).

The Chairman.—In Essex we use what we call sandals for covering the hob-nailed shoes, in order to prevent the corn from being broken. I am, at the same time, of opinion, that in some of the machines the beaters are placed so near the bridge, that they do crack the wheat: and to obviate this mischief, greater speed should be given to the machine; in fact, the thrashing machine should have sufficient speed without the necessity of making the horses go too fast (hear). In many of the machines there is a box in the centre for the driver, who, before he has been sitting there long, in all probability will fall off to sleep; and the only way to remedy this is to beat this box off the machine at once, and make the driver go round with the horses, and keep them properly at their work. You will find your thrashing much better done in this way than when he sits in the centre (hear). I quite agree in the opinion that the little portable hand machines do not break the wheat so much as the large ones; neither do they injure the straw, and they are cheaper. I now come to the point of using steam power; and I admit that it must be the cheapest and best power which can be adopted for the purpose. But you must have the necessary accommodation of buildings (hear). I have in my occupation four or five large barns, and could not use a steam-engine with any great advantage: I could use a portable steam-engine certainly.

Mr. Bell (addressing Mr. Moreton): You only allow five per cent. for keeping your steam machinery in repair. I do not think that is enough.

Mr. Morton: Every part of the machinery was new; a machine, which would cost 600*l.* when I had mine put up, can now be erected for about 320*l.*

Mr. Oakley: I have not been accustomed to thrashing corn generally by machinery, but as far as wheat is concerned, I have met with machinery which did not crack it; and as far as barley is concerned, indeed, I have found the same. I have been in the habit of selling barley to maltsters, who certainly would have found it out if it had been cracked or did not sprout (hear, hear). I am not in the habit of making observations among farmers; but from what has fallen to-night, I think that we ought to bear in mind the different positions of different farmers before we call this the best system or that the best system (hear). For instance, I was driven to the use of machinery in this way: I am farming in the neighbourhood of Chatham dockyard, in which there has of late been so great a demand for labourers as to take all our surplus labour. Last Michaelmas I lost ten very good labourers, who left me because they could get 9d. a day more in the dockyard than I could pay them. They were perfectly justified; of course we should all do the same. But I was driven to defend myself, and I did so by the adoption of machinery. I had to consider that that machine which made my straw less valuable, and consequently less marketable, would not suit my purpose, and that I must have one which would not do this. Well, Mr. Garrett and his brother laid their heads together, and they succeeded in constructing a machine which would thrash the corn without injuring the straw. This I use, and my straw goes to market as fast as it can be tied up. I thought, gentlemen, it was only fair towards Messrs. Garrett that I should mention this circumstance, as they had succeeded in making me such a machine as I wanted (hear, hear).

Mr. James Wood: Do you feed this machine sideways or straight?

Mr. Oakley: Sideways. I use four horses from six o'clock in the morning until eleven, and four more from one to five; and in the intermediate time the men sift the thrashed corn. In this way I get about ten quarters of wheat thrashed in a day. Three men are occupied in getting up the straw; and taking all things together, I get the corn thrashed and the straw tied up at about the same expense as I should if I used the flail—of the two modes, I think that by the machine rather the cheaper. It would be very much the cheaper if we did not grow the straw quite so long as we do in our part of the country. In a short straw country I am satisfied that Mr. Garrett's machine would thrash fifteen quarters as easily as it does ten with us (hear, hear). I have a very large hop cultivation on my farm, and in dry weather want all the men I have got. I unload a barge and a half of dung every week; some of the men spread it, while the others go to fetch more; so that I keep all well employed. After a few other observations, Mr. Oakley concluded with the remark, that whatever they might say, or whatever they might do, it came to this, that the man who produced most corn at the least expense was the best farmer; and that economy therefore ought never to be lost sight of (hear, hear, and cheers).

Mr. Fisher Hobbs: There is one other point to which I would advert, and that is the number of buildings required to carry out the flail system (hear). If there be a large number of buildings on a farm, the landlord takes that into consideration with regard to the rent. A farm of four hundred acres would require two barns, if the flail system were carried out. The general practice in Essex is to have long porches; and it would require two porches, which would cost 50*l.* each, to carry out the custom of thrashing with the flail (hear). I recently went over a farm of 600 acres belonging to Lord Torrington, on which there was only one barn, with a thrashing machine worked by horse power, and which I told his lordship ought to have been worked by steam power. There is certainly a saving of 1s. to 2s. an acre effected by using steam power; for you will, I think, agree with me that the landlord would put on ten per cent. for extra farm buildings; and this fact is greatly in favour of using steam power, which obviates the necessity of erecting additional buildings.

Mr. Morton: I am at the present time erecting a barn, and a steam engine in it, for a farm of nine hundred acres; the barn is 40 feet long and 20 feet wide.

Mr. James Wood: I have been listening, Mr. Chairman and gentlemen, very attentively to the observations which have been made this evening, and I think I have been in some degree edified (hear). I am not aware that I shall myself throw any additional light upon the subject, but I am of opinion that the tendency of all the arguments has been in favour of the use of steam power as the most economical (hear, hear). The great difficulty is with regard to buildings, and I think that a sort of locomotive steam thrashing machine, which would be adapted to our uses without the necessity of erecting buildings expressly for the purpose, is a great desideratum; that is to say, that you should have a steam power without being put to the expense of digging holes, and making all the ordinary plant of steam engine premises (hear). If you had such a machine as I describe, you might thrash, winnow, and put away your corn at once; but if you have to winnow the corn, and remove the chaff afterwards, it is very inconvenient. My county (Sussex) has not the credit of having advanced very much in the use of machinery, but I think that a travelling machine of the description to which I have alluded would be very much approved. With regard to retaining the chaff, that is what I do not wish to do myself, for I think it is a very indigestible substance, and consider it more profitable to cut straw into chaff than to feed horses with the chaff from the wheat.

Mr. Fisher Hobbs (to Mr. Morton): Do you think a locomotive machine would answer the purpose?

Mr. Morton: I certainly should not recommend a portable machine. My first object on a farm is to have a steam engine erected, but not a portable one.

Mr. Beadell said, as a practical man he was satisfied with machinery, and thought it did its work much better than the flail.

Mr. Aitcheson: There is a question which we have not touched upon to be considered, with regard to a fixed steam apparatus. Mr. Morton has spoken of erecting a steam engine on a farm of 900 acres. Now, that embraces a very large surface, and the distance from one extreme point to another would be considerable. This I think would in many cases involve much inconvenience: it might be all very well in a level country; but in the case of a hilly country the difficulty of carrying everything to one focus I think would not bear out your principles of economy.

Mr. Beadell.—I think Captain Aitcheson assumes that which is not necessarily the fact. He assumes that, if you have a steam-engine erected in a particular spot, you must necessarily do all the work there, and must necessarily cart all the dung to the distant lands. Now where the country is hilly, what is there to prevent the stacks being made in the field, and at leisure be brought home to be thrashed, taking your straw back again to fold or to fodder out as you require it? (Hear.)

Mr. Aitcheson.—There is still this objection, when all is said and done—that you incur the expense of double carriage.

After a short further discussion upon this point,

The Chairman said—I think we can come to no conclusive resolution upon the relative merits of thrashing by machinery and thrashing with the flail, as the mode must always be adapted to circumstances. With regard to the question of economy, there appears to be little difference between the cost of thrashing by horse-power and thrashing by manual labour; but if you are in a position to avail yourselves of the steam-engine as Mr. Morton proposes, then there is doubtless a great saving of expense (hear, hear); but unfortunately it so happens, that the majority of tenant-farmers are so situated with regard to their tenure, that it is impossible, or if not impossible, it would not be prudent to go to the expense of 200*l.* or 300*l.* in erecting machinery; and they do not find the landlords willing to do it for them (hear, hear). This is a great obstacle to the introduction of machinery (hear). I quite agree with Mr. Hobbs, that when machinery is used, there is not the less demand for labour than otherwise (hear). So long as machinery is conducive to better cultivation, so long must it be advantageous to the labourer (cheers). For machinery cannot take the place of manual labour entirely; it can only be auxiliary to manual labour (hear, hear). But I am quite sure that in many cases machinery is used at greater expense than manual labour. Such is the mania of some men; with regard to their particular hobby, that they will run into extremes in the adoption of machinery, or in any particular plan of their own. For instance, we some times see that farmers will run into the extreme with regard to grazing, when they ought to graze in part and grow corn in part; and others will run into the extreme of growing nothing but corn when they ought to graze in part (hear). Many men adopt machinery where it is not advantageous, because they think that to be useful it must be general; but machinery was never intended to supersede manual labour—only to assist it (hear, hear). Whatever may be said about increasing the quantity of corn grown in this country, we should recollect that nature has set her bounds to the extent of produce, and beyond those bounds we can't go; it is the same with machinery. You may do a great deal with its assistance, but there are limits which you cannot exceed (hear).

Mr. Bell.—If we look to our Scottish brethren we may see the advantages of the application of steam power to the purposes of agriculture. In the north steam has been in operation for thirty or forty years.

Mr. Aitcheson.—Then this question arises, namely, whether the population of our southern counties will bear the comparison with Scotland? It may be all very well to use machinery where you have a thin labouring population; but I am quite aware that if we take the twelve central counties of England, we shall find that the population and the number of agricultural labourers are about three to one greater than in Scotland. Here we have a superabundant population which we must employ.

Mr. Morton combatted Mr. Aitcheson's opinion as to the comparison between the populations of England and Scotland.

Mr. Aitcheson thought that the Club ought to come to the conclusion that where machinery could be well employed it should at certain times be adopted, but that as there was not a great difference between the expense of thrashing by machinery and the use of the flail, they ought to give the labourer the benefit of the latter in pounds, shillings, and pence, in preference to employing machinery.

Mr. Hobbs could not agree with that, because he was convinced that those who used the most machinery employed also the most manual labour. Why then should they come to the conclusion that it was not advantageous to use machinery?

Mr. Aitcheson.—In the north they could not reap their harvests unless they used machinery.

Mr. Grey.—There is great difficulty in getting hands in the north.

Mr. Hobbs (to Mr. Bell).—I think you prefer water to steam power applied to machinery.

Mr. Bell.—No doubt water power is the cheapest and the best, next to steam.

Mr. Morton.—The expense of water-power is the same as steam, except that the water you get for nothing, and with steam you have to pay for the coals (hear, hear).

After some further discussion,

Mr. Fisher Hobbs proposed the following resolution, which was seconded by Mr. Oakley:—"That it is the opinion of this meeting that the application of machinery by water, steam, or horse power, to the general purposes of thrashing corn, is more economical and advantageous than the common mode of thrashing with the flail by manual labour" (hear, hear).

The Chairman.—It may be more advantageous to the tenant, and not to the labourer.

Mr. Morton.—We have nothing to do with that. When I want labourers I go where I can get the best men; I go to the best market for labour as I would for anything else (hear, and a laugh). There is a good dea of erroneous opinion abroad in this respect.

The resolution having been seconded, was put and carried unanimously.

TENANT RIGHT.

Mr. Aitcheson said there was an important subject which had been under the consideration of this club, which had never been satisfactorily settled. He alluded to the subject of tenant-right. There had been two or three discussions upon it, and then it had been allowed to fall to the ground. He (Mr. Aitcheson) had been written to by the Secretaries of several clubs, to ascertain whether it was the intention of Mr. Shaw to resume it. He thought they would do well to resume the question, and not let a matter of so much importance slip through their fingers (hear). A Committee had been appointed, but had not made any report.

Mr. W. F. Hobbs.—The Committee has never met. Now, as I think it is the wish of this Club that the Committee should have an early meeting, I beg to propose the following resolution:—"That this meeting, considering the importance of the subject of *tenant-right*, which was lately discussed by the members of this club, and referred to a committee, request that the said committee will present their report at the next monthly meeting" (hear, hear).

Mr. Pell seconded the resolution, which was carried unanimously, and the meeting separated.

PECULIAR FEATURE IN SCOTCH LAW: NIEL MACDONALD *v.* WILKIE, &c.—At the Justice of Peace Court, Dundee, on Monday, upwards of fifty cases involving the right of a farmer to recover rent under certain circumstances, for potato ground, came on for decision, and excited much interest. The facts are shortly as follows:—Mr. Macdonald is the principal tenant of the Forthill of Ballgillo, and he has been in the practice of sub-letting detached portions of his farm to parties residing in Broughty Ferry and neighbourhood, for the purpose of growing potatoes. It seems that the pursuer ploughed the ground, and supplied the manure, and that the sub-tenants afforded the seed, and attended to the cleaning and culture afterwards. In consequence of the failure of the crop, the sub-tenants this year refused to pay the stipulated rent, which, of course, is much higher than the rent paid by the pursuer to his landlord. These cases were brought before

the Justices (David Miln, Alexander Balfour, and William Thomas, Esquires, being on the bench), for the purpose of trying the question. On the part of the defenders, reference was made to the law on the point as laid down by Erskine, by which it appears " that, though the tenant should have got possession, and sown his arable grounds, the landlord cannot by the Roman law claim any part of the rent, if inundation, the calamity of war, the corruption of the air, or the inclemency of the weather by earthquakes, lightning, &c., hath brought upon the crop damage *pluiquam tolerabile*;" and that though it is not exactly defined what degree of sterility or vastation makes a loss that cannot be borne, it is said to be the common opinion that " the tenant is liable for the rent, if the produce of the crop exceed the expense of the seed and the tillage." Evidence was led of the almost total failure of the crop in question; and the Justices, with reference to the foregoing authority, assoilized all the defenders, with one exception, where it appears the potatoes had been taken up early—the defender declaring his willingness to pay.

MACHINERY, AS IT AFFECTS THE INDUSTRIAL CLASSES.

BY W. CARPENTER.

CHAP. I.—THE PRODUCTIVE POWER.

There is no question appertaining to the economical and social condition of the industrial classes of the United Kingdom, upon which a greater diversity of opinion prevails, than upon that relating to the application of mechanical powers to the purposes of production, and the influence which it has upon the employment, wages, and comforts of those classes.

It is affirmed, on the one hand, that the condition of the labouring population has been ameliorated and improved in proportion as the resources of science and mechanism have been rendered available for the purposes of production; while it is as strenuously maintained, on the other hand, that the consequences of increased production, by the aid of mechanical power, exhibit themselves in the reduced wages, inconstant employment, and severe labour of the working classes generally, and especially of the operatives in the manufacturing districts.

This question, apart from its intrinsic interest, is by no means unimportant in relation to the corn-law controversy, seeing that it is a common device of the corn-law champions to attribute all the evils affecting the industrious classes, especially of those employed in manufactures, to the use of machinery, and to deny that they are in any way referrible to the operation of the corn-laws.

That a greatly augmented power of production should operate prejudicially to any community, is a thing incredible upon the very face of it, seeing that the effect of such augmented power is to multiply and cheapen commodities, and thus to provide a larger quantity for the several individuals of whom the community consists.

At the era of the Revolution, the income of Great Britain is estimated to have been £43,000,000. Arthur Young, in 1766, computed it at £100,000,000. Mr. Lowe states it at £125,000,000, in 1792; at £170,000,000, in 1806 (which would be equal to £220,000,000 in the currency of 1792), and at £188,000,000, in 1814 (or £350,000,000 in the former currency). Since 1818, the national income appears less than it really has been, in consequence of the depreciation of the currency, which may be stated at one-third; but, after making allowance for this, its amount in 1832 is very reasonably estimated by Mr. Lowe at £300,000,000, to which is to be added, as a conjectural amount, the taxable income of Ireland, £25,000,000; making, in the whole, an annual income of £325,000,000. There has been a further fall in profits and wages since 1822; but we shall not be far from the truth, perhaps, if we assume the aggregate annual wealth of the country—the produce of her industrial powers—to be about £500,000,000. Mr. Alison estimates it at £514,000,000.

This cursory glance at the progressive income of the country may afford some idea of the enormous augmentation that has taken place in our productive powers, by the invention and application of machinery. When it is remembered that the fall in prices has been not less, in the aggregate, than from 50 to 70 per cent. since the close of the war, it will at once be seen that nothing but an amazingly increased power of producing could have sustained our income at its former amount, much less have carried it beyond. The increase in the productive powers of the country is, in fact, as I have already stated, enormous. During the last fifty years, we have obtained a mechanical power, applicable to the processes of manufacture, equal to the labour of £600,000,000 of human beings; the consequence has been, an enormous increase in the quantities produced, and a proportionate reduction in the prices at which they sell.

CHAP II.—MACHINERY AND MANUAL LABOUR.

We have seen, in the preceding chapter, to what an amazing extent the producing power of the country has been augmented during the last half century, and how prodigiously—if not in the same proportion—the produce of the country has been increased. The facts there stated are not denied by those who abuse machinery as the cause of poverty and social disorganization; but they allege that, "in the actual state of human society, the market value of labour depends on its supply: it is cheap or dear, in proportion as it is plentiful or scarce, compared with the effective demand there is for it. But machinery diminishes the scarcity of labour in every branch of industry to which it is applied; and, in so doing, it robs labour of its protection and reward. Increase the demand for commodities produced by the aid of machinery as you will," say they, you do not necessarily increase the demand for human labour, since the perfection of mechanism may be carried so far as to be rendered adequate to supply the largest demand that could be conceived of, with but comparatively little assistance from manual labour. On the contrary, each fresh improvement made in the mechanical contrivances applied to the production of articles of consumption tends, first, to displace human labour, by superseding the necessity for its employment, and next, to reduce the rate of wages, by multiplying the number of unemployed hands."

Such is the substance of the argument which represents the use of machinery to be injurious, upon the whole, to the working classes—an argument which, if sound, opens up before us a very melancholy prospect, for it presents but one of two alternatives; either the complete annihilation of machinery as a means of production, or the utter impoverishment and destitution of the great mass of society. Either alternative would be melancholy enough; but with the assurances which we have, both from within and from without, that the application of machinery to the purposes of production never will be abandoned, the other alternative assumes a melancholy aspect indeed. Let us see whether it is warranted by known facts or reasonable deductions.

In no department of industry has the power of machinery made greater strides than in the cotton manufacture; but in no department has the employment of human labour been more extraordinarily increased. A transition from one sort of weaving and spinning to another there has undoubtedly been, but the increased amount of human employment has been prodigious. In 1760, the cotton manufacture employed 40,000 persons. Now, including those employed in making the machinery used, the total number is estimated at 800,000; being twenty times the number employed before machinery was introduced into the factories—at least, such machinery as is now complained of. And this has been done without any diminution, but, on the contrary, with an increase, in all other departments of industry. So far as can be ascertained, in fact, the application of machinery to effect an increase of production has never, in any instance, reduced the total amount of hand-labour employed, upon the whole, or in general.

Colonel Thompson, who has devoted much thought and inquiry to this subject, in common with most other matters pertaining to political economy and the social condition of the working classes, mentions two or three instances of a very striking character, to show the delusions under which persons have laboured in reference to the subject of machinery. One of these cases occurred in the printing trade, from which a deputation of compositors waited upon a friend of the colonel's, to request his aid in getting up a petition to Parliament against the use of printing machines.

But let us state the case in the colonel's own language:—

"Three or four years ago," he says, "a periodical publication made a representation of the consequences attending the introduction of a paper-making machine near Edinburgh, and exhibited the reduction of hand-labour, as proved by the discharge of sixty labourers from the old mill. In a reply which he transmitted to that journal, he stated, as correctly as he was able, the facts of the invention, progress, and completion of this particular machine. It was the work of twenty years, at a cost of from £20,000 to £30,000, and was at the time the ruin of the inventors, though they were (many years afterwards) relieved, to some extent, by a grant of money from Parliament. The proprietors gave employment to a great many persons, for many years, before the machine could be perfectly and usefully employed. The machine came into use gradually, and the price of paper fell with it, and the consumption of it vastly increased. The number of persons to whom this increase of consumption gave employment, went on increasing, and never ceased to increase. There were the collectors of the materials for the paper, builders for warehouses and mills, the machine makers, carriers of all sorts, sailors, shipwrights, riggers, sailmakers, miners for coals, iron, and copper; printers, booksellers—every one of whom, to the extent of hundreds, if not of thousands, had his employment extended before the sixty hands were discharged from the Scotch mill. And even on the fact that sixty hands were wholly put out of employment there, very great exaggeration is suspected to have existed. Ten years ago, my friend says," continues Colonel Thompson, "a deputation of compositors came to him to assist them with a petition to Parliament against the use of printing machines. This led to an inquiry in the trade, when it was proved that, by the joint aid of paper-making and printing-machines, the number of compositors in employment had been increased to an amount which it never could have reached under the old state of things. It was agreed that no case could be made out to Parliament, and no application was made. But this case is nothing to what came next. A deputation from the pressman's committee followed, with complaints that press-work was diminished by the use of machinery. And it was proved, on examination, that press-work *had increased*, and the number of pressmen was greater than ever it had been before. By 'pressmen' is reasonably to be understood both those who continued to be employed in the old work—which, it would appear, must have been increased in consequence of the general increase of business—and those who were employed in similar, if not exactly the same operations, about the new presses. To make this generally understood, it may be useful to note, that under any state of machinery, there is a quantity of work dependant on the rest, which will be always done by press-work in the old style. A parallel case of increase (without standing on the precise amount) is seen in the statement popularly made, that the use of railways will end in increasing the number of horses employed in coaches. That every railway is attended with the employment of a number of new coaches in lateral directions, is an illustration of the principle involved, whether in the end they demand an equal number with the old road or not."—(*Thompson's Works*, vol. vi. pp. 86, 87).

These facts furnish, as Colonel Thompson remarks, a fair illustration of what is meant when it is said that the use of machinery does not lessen the demand for human labour. It is not meant to be said, that it does not sometimes occasion labour to change hands; but that, upon the whole, and without reference to particular individuals who may be affected one way or the other, its tendency is to keep up, and even to increase, the number employed.

But it seems to me that these and similar facts, though satisfactory enough as far as they go, are too limited to lead to a satisfactory conclusion on the whole questions touching the influence of machinery on the condition of the labouring classes. They leave untouched some of the most important points involved in the inquiry; and if the question be left where the reasoning founded upon these facts places it, those who contend that the benefits of improved and cheapened processes of production extend to the working classes, as well as others, will abandon their strongest ground, and put up with a comparatively weak position.

CHAP. III.—THE QUESTION OF MACHINERY FAIRLY STATED.

To determine in how far machinery affects the condition of the working classes one way or the other, it is not enough to compare the condition of those classes now, and their condition at some antecedent period, when they were placed, by other causes than machinery, under different circumstances; as previously to the continental war, when their numbers were much fewer, or during the war, when the demand for their services was much greater. And yet, this is the course usually taken by the opponents of machinery. It is thus that Mr. Oastler—the ardour of whose benevolence frequently runs away with his judgment—expatiates upon the deteriorated condition of the labouring classes, attributing the change to what he calls the "unlimited use" of machinery—a phrase, by the way, not very intelligible. But let that pass. Here is his plaint:—

"It has produced havoc in the districts where it abounds; and, like the fiend whom Shakspere represents as 'coming hot from hell,' it has let slip the dogs of war. It has driven the aristocracy from their estates, and now keeps them away, under the hint that residence is dangerous; and has thus left the people in the hands of mercenary tyrants, who, like the middle men of Ireland, fatten on the wasting property of the absentee lords of the soil. It has unsettled all the old foundations of justice and humanity, united and rased up a power that tramples upon law, and sneers at the simpleton who pleads for the poor. It has razed to the ground the former refuge for the weary and heart-broken traveller through life's thorny road, and built for them a bastile, which, frightful as it appeared at first, has become at last so familiar, that the poor will walk into the den rather than die in a ditch. It has converted the once happy hives of busy bees into a nest of hornets, and the land which was formerly the cradle and the castle of freemen, has become the grave and the dungeon of slaves."

That is a specimen of the way in which the use of machinery is assailed, and of the kind of reasoning by which it is made responsible for nearly all "the ills that flesh is heir to." That it is utterly fallacious, as proceeding upon narrow and inadequate grounds, it will be easy to show.

In order to form a just estimate of the benefits which machinery has conferred upon that class of persons who are dependant upon their industry for the means of subsistence, we must endeavour to ascertain what they would have been, and what their condition, had no such means of production enlarged the sphere of manufacturing industry. Let us, with an eye to this, divide the working population into the two great branches of industry —manufactures and agriculture, and see what our daily growing population would have been, had it not been provided for by manufacturing processes. And let it be remembered, as we have already shown, that these processes would have been utterly insignificant, compared with their present magnitude, had it not been for increased consumption, promoted by the cheapness occasioned by the employment of machinery in conjunction with manual labour.

It is scarcely necessary to accumulate facts to show, that, as prices have been reduced by cheapening and enlarging the power of production, the consumption of the articles thus more cheaply and plentifully produced has been proportionately increased. At the time when a pair of silk stockings were presented to Queen Elizabeth, they are said to have been worth their weight in gold; and not another person in the kingdom, probably, wore so costly an article. By the improvements subsequently introduced into the process of manufacturing silk stockings—first, by Sir Thomas Lombe's mode of "organising" (or preparing for the weaver) raw silk by machinery; and next, by the invention of the machine known as the "stocking frame," which largely superseded manual labour in knitting, the article has long been produced at so low a price, that it has become one of ordinary use, and many thousands of hands have been constantly employed in its fabrication. (Mr. M'Culloch estimates the consumption of silk stockings and gloves in England to amount, annually, to £2,500,000.)

It is the same in other branches of production. Before Richard Arkwright invented his machinery for spinning cotton, and Dr. Cartwright his power-loom for weaving it, the prices of cotton fabrics were so high that the demand for them gave employment to comparatively few hands. I have already stated the number at forty thousand. The number now employed is estimated at more than half a million, independent of those employed in making and repairing the machinery used, in carrying away and disposing of the raw and manufactured materials, &c.

Now, without at all adverting to the benefits conferred upon the consumers of these and other commodities—these consumers being *the whole* population, working classes included—let us try if we can form an idea of the possibility there would have been of disposing of our increased and increasing population, had no new channels of employment been created by that extension of manufacturing industry which has been consequent upon the employment of machinery.

CHAP. V.—INADEQUACY OF AGRICULTURE TO SUPPORT THE POPULATION.

To see the inadequacy of the land to subsist the population, we need only to look at the tendency of labour to transfer itself from agriculture to manufactures, for several years past. The following are the centesimal proportions of those employed in manufactures and in agriculture, at each of four decenary enumerations. The increase it shews in one branch of industry, and the decrease of it in the other, cannot fail to strike every one who looks at it:—

Periods.	Agriculture.	Manufactures.	Miscellaneous.	Total.
1811	35	44	21	100
1821	33	45	22	100
1831	28	42	30	100
1841	22	46	32	100

From this it appears, that, in the course of 30 years, the centesimal proportion of families employed in agriculture, calculated upon the gross numbers, fell from 35 to 22; while those employed in manufactures and trade rose from 44 to 46. In fact, more than this; for, of the remaining centesimal part (32) upwards of one-fourth consists of miners and others, in some way connected with manufactures and trade. So that the proportion of those engaged in manufactures and trade, &c., in 1841, will stand 54; while those employed in agriculture are only 22. In the former branch of industry there is an increase of 22 per cent., in the latter a decrease of 36 per cent. So that the one has gained upon the other in the proportion of 58 per cent.

If the "Analysis of Occupation," in Marshall's tables, be looked at, it will be seen that while the increase in the whole number of families, between 1811 and 1831, was at the rate of 34 per cent., the addition made to the agricultural class was only 7 1-5th per cent., while the manufacturing and trading classes received an accession of 27 per cent.; and the other classes, not comprehended under either of these, were nearly doubled. The same thing will appear upon an examination of the population in the chief agricultural and the chief manufacturing counties, at different periods. The following table shows the centesimal proportions of agricultural, manufacturing, trading, and other classes, to each other, in three of the principal agricultural, and in three of the principal manufacturing counties, at each of three decenary enumerations. It will be observed how the proportions of the agricultural and of the manufacturing population have varied, the former decreasing and the latter increasing at each subsequent period. It must be borne in mind, too, that a large proportion of the persons placed under the head of "others" should really be added to the manufacturing and trading classes, as they are employed in producing articles necessary to the prosecution of some branch or another of manufacturing or trading industry; as miners, road-makers, canal-diggers, lawyers, physicians, bankers, &c. This will make the centesimal proportion of the manufacturing and trading classes larger than it here appears to be.

Counties.	Agriculture.			Manufactures, Trade, &c.			All Others.		
	1811.	1821.	1831.	1811.	1821.	1831.	1811.	1821.	1831.
Bedfordshire . . .	63.1	61.9	56.8	27.9	27.8	25.7	9.0	10.3	17.5
Bucks	53.3	57.6	53.0	33.4	28.8	26.4	11.3	13.6	20.6
Essex	55.2	55.7	52.9	27.5	28.8	28.0	17.3	15.5	19.1
Lancashire . . .	14.4	11.2	9.5	70.7	74.9	66.7	14.9	13.9	23.8
Warwickshire . . .	30.8	27.9	21.9	60.7	65.2	59.9	8.5	6.9	18.2
Yorkshire, W. R. . .	23.1	19.6	18.2	64.8	67.4	69.4	12.1	13.0	12.4

This shows, very satisfactorily, that from the period of the first enumeration (1811) downwards, there has been a considerable migration of labourers going on from the agricultural to the manufacturing counties; and that, even in the agricultural counties themselves, a large number of the people, formerly employed upon the land, subsequently employed themselves in manufactures, trade, &c. Look at Bedfordshire, which stands at the head of the agricultural counties. There the centesimal proportion of agriculturists has been reduced from 63.1 to 56.8; and in Essex, which stands third in order of the agricultural counties, the proportion of agriculturists has been reduced from 55.2 to 52.9. In looking at the three manufacturing counties, Lancashire, Warwickshire, and the West Riding of Yorkshire, the great decrease that has taken place in the number of persons employed in agriculture, and the large increase in the number of those employed in manufactures, &c., are equally apparent. In Lancashire, the centesimal proportion of the agriculturists sunk, in the two years, from 14.4 to 9.5, while that of the persons employed in manufactures, &c., rose from 84.16 to 89.15, and in Warwickshire from 68.15 to 77.11.

That the migration from the agricultural to the manufacturing districts has been of a healthy character, and has been induced solely by the demand for labour, and, of course, higher wages in the one than in the other, there can be no doubt. Mr. Muggeridge, speaking of the emigration going on into Lancashire, in 1836, says—

"It seems, indeed, to be fortunately understood that migration has not been promoted to cheapen labour; that it is not the wish nor the object of the employer to bring hence a family to work at a low rate of wages to displace one who is working at a higher, but solely to fill up a gap in his establishment, created by the increased means of employment he possesses from the extension of his trade, and the diminution in the number of available workpeople, occasioned by their dispersion among the large concerns daily arising into existence on all sides of him; and which are so apparent that, with the solitary faculty of sight, a person can scarcely be ignorant that a large increase of population must be brought from some quarter. There exists, therefore, no feeling of rivalry between the northern and southern workpeople; no idea that one labourer is attempting to undersell or to compete with the other in the labour market; his migration is viewed only as a fair and honest endeavour to supply an acknowledged and legitimate demand."

Here we have, then, on the one hand, in the rural districts, a population fully equal to, and exceeding, the existing demand for its labour, and requiring outlets for the increase of its numbers; and, on the other, that is, in the manufacturing districts, a demand for labour, which draws thither a constant stream of emigrants.

Now, to what is this transfer of labour from one occupation to the other attributable? Manifestly, to the inadequacy of the one from which it transfers itself, to absorb its increasing magnitude. If the labourers born and bred in the rural districts could have obtained the means of existence by their labour on the land, they would not have abandoned it for the labour of the factories. Had there been an adequate demand for the labour of the rural population, in rural occupations, they would not have left their homes, and have migrated into distant counties, to obtain employment in other occupations. Nor would they, under any circumstances, have transferred their labours from one branch of industry to another, unless they had bettered their condition in so doing. Men do not go from better to worse, they do not voluntarily "jump out of the frying-pan into the fire." If they abandoned agriculture and its wages, it was because manufacture and its wages were preferable, as giving them more comforts, improving their standard of living, and raising them, at least something, in the scale of civilization and social enjoyment. It may be said, by some, that they left their former field of industry under false representations, and were not really benefited by the change. But the idea is preposterous. An individual, or a number of individuals, may be deceived by false representations as to the superiority of one occupation or locality over another; and, being thus deceived, they may transfer their labour thither, to their own prejudice. But the deception would immediately become known, and therefore stopped; it could not be successfully carried on for a series of years, as the migration from the agricultural to the manufacturing counties has been.

CHAP. V.—MANUFACTURES MORE REMUNERATE TO THOSE EMPLOYED THAN AGRICULTURE.

I have shown, beyond all dispute, that ever since the close of the war there has been a constant stream of emigration from the agricultural into the manufacturing districts of the country; and from this fact I have inferred—what must be obvious to every one—namely, either that employment could not be found in agriculture for the constantly increasing population, or that manufactures remunerated the labourer better than agriculture did. Nothing can be clearer or more certain than this inference.

But we are not reduced to the necessity of inferring the improved condition of the labourers from the fact of their migration, or the change of their occupation. That the labourers have substantially benefited themselves and their families by transferring their industry from agriculture to manufactures, and other branches of production, is a fact capable of direct proof, within reach of everybody who will but take the trouble to look for it. Does not all the world know that the rate of the wages of agricultural labourers is the lowest rate that obtains in the kingdom, not excepting even that obtaining among the hand-loom weavers, whose condition is so peculiar as not to admit of comparison with that of any other labourer.

Let us now proceed to particulars; and that we may not expose ourselves to the charge of misrepresentation, let us take the evidence furnished in the reports of the Commissioners of the Poor-laws, and in the report of the Parliamentary Committee for inquiring into manufacturers' employment. The facts therein stated are beyond all suspicion, inasmuch as they were collected from witnesses who could have no motive to deceive, and were published to all the world, thus challenging contradiction if they were false.

It is stated in the first report of the Poor-law Commissioners, upon the authority of the Assistant-commissioner, Mr. Kay, that nothing could have been more gratifying than a tour he made amongst the families of English labourers, who had migrated from the south of England into Lancashire, and the West Riding of Yorkshire, during the years 1832 and 1833. They were, for the most part, located in well-built and pleasantly situated cottages, surrounded by those decent comforts and conveniences which exercise so important an influence on the manners, morals, and happiness of the working population, schools being also provided, in which their children were instructed on Sundays, and on certain of the week evenings.

A reference to the comparative earnings of these labourers in their old and their new vocations, will at once show how greatly they were benefited by transferring themselves to the districts and occupations in which machinery is so largely employed.

Let us take a case or two by way of example:—

"Joseph Shepherd, aged 50, from Bedlow, (Bucks).—Wife dead twelve months ago; family of eight children; has been thirteen weeks here; earned 7s. per week at Bedlow, as a farmer's labourer, or received this sum from the parish, in which latter case he worked upon the roads. Joseph, aged 19, was employed by a farmer at 4s. per week, and when not thus employed, received 2s. 6d. per week from the parish. James, aged 18, lived with a farmer, and received board and lodging, and £2 a year for his work. None of his earnings assisted the family. Thomas, aged 16, had 3s. per week in harvest, and at other times was at home with his father, and earned 1s. 6d. George, aged 15, worked in a paper-mill, and earned 2s. to 2s. 6d. per week. Eliza, aged 11, earned at the lace pillow at school from 6d. to 9d. per week. None of the other children earned anything. The wages of the family, taking everything into consideration, did not, when they were in employ, exceed 16s. 3d., but Shepherd thought the average much lower. He said about 12s. per week. He paid 1s. a week for a thatched cottage, with a garden. He was greatly favoured by his landlord in having this cottage at so low a rent. He was able to afford but little for clothing, and when he went to the Messrs. Ashworth's mills, at Egerton, near Bolton, the family were in tatters. He was glad to conceal his nakedness beneath his smock frock. The family now earn £2 1s. 6d. per week; in their second year they will earn £2 8s. 6d.; and in their third year, £2 16s. The children, when he was in Bucks, were scattered about in the farm-houses; they are now gathered under his own roof; he has bought good clothes for them and for himself. Has an excellent cottage, for which he pays 2s. per week. Has been exceedingly well treated by his employers and the workmen.

"Thomas Wright, aged 32, migrated from Cranfield, in Bedfordshire, with his wife and four children. He was a farmer's labourer, and earned 7s. a week. His wife obtained, by working at the lace pillow, 1s. a week. James, aged 13, was a plough-boy, and earned 1s. 6d. a week. Neither of the other children, the eldest of whom was 12 years of age, earned anything. The total earnings of the family was, therefore, 2s. 6d. weekly. He paid £2 5s. annual rent for a very miserable cottage. His present cottage is a gentleman's house to that. Fuel was very dear there, but is cheap here (that is, in Melrose, in Derbyshire, whither he had migrated). The family now earn, in Mr. Clayton's mill, as follows:—Thomas, father, as labourer, 12s.; his wife keeps house; James is in the factory, and earns 4s. 6d., as does the next son, aged 12 years; making the total weekly earnings 21s. He pays 1s. 6d. weekly rent for a good cottage, containing four large and lofty rooms, and furnished with an oven, with step stones, and with other desirable cottage conveniences. If the parish officers came and offered him £20, or £30, or £40 he would not go back. He remembered the fear of starving too well for that. That is," he adds "a country which I call in a starving state; but we have plenty here, and the master behaves like a gentleman to us."

To multiply these cases would be uselessly filling up our space. Those who wish to peruse more of them, may find a large collection in the first, second, and third reports of the Poor-law Commissioners. The facts are given from the statements of the workpeople themselves, who speak in the most exulting manner of the improvement that had taken place in their circumstances, through their migration from the agricultural to the manufacturing districts.

These cases, which are a fair sample of the whole, are borne out and confirmed by other and independent proofs. For instance, there is, as to the wretched condition of the agricultural population, a letter to be found in the second Report, signed by a number of agricultural labourers of the parish of Bedlow, in Buckinghamshire, who represent themselves and their families to be in the extremity of distress for want of employment, although "all able-bodied men, most willing to work, and very unwilling to live in idleness, or on charity."

"The married men (say they) are paid 7s. a week, in harvest they may earn, for four weeks, or perhaps five weeks, as much as 15s. a week; but this is the extent of their earnings during the year. The seven shillings are spent as follows:—We pay 4s. a week for bread, this will be a little more than eight quartern loaves. We pay about 1s. 9d. for bacon, and the remaining 15d. is laid out for soap, candles, sugar, tea, thread, worsted, and such necessaries. We have nothing left. We have no money left to buy clothing or fuel, or to pay for our rent, which may be taken on the average at 60s. a year. We must depend upon accident for these supplies, and of course, therefore, we generally go without them. If we manage to save a guinea out of our earnings in harvest, it is really all expended in paying for shoes, which cost us 15s. or 16s. a pair. Those among us who are single are paid only 2s. 6d. a week, which is spent as follows:—Thirteenpence are laid out in buying two quartern loaves, 1s. in buying bacon, 2d. in lard, and the rest in sugar, which we mix with water without tea. We have nothing left to pay for washing or lodging, yet these cost us 10d. a week, for which we are obliged to run in debt, till chance enables us to pay. None of us, whether married or single, can buy beer; it is often that we spend weeks without tasting it, yet we work from seven in the morning till four in the afternoon. The distress which we sometimes suffer cannot be conceived by you. . . . On Fridays and Saturdays we have scarcely any bread remaining in the house, and no money to buy more. If any of you could enter our houses, and see how destitute we are, with wives and children almost starving, but wanting the means to satisfy them, wanting every comfort, and unable to buy even fuel to warm them, or clothes to cover them, you would not charge us with impatience or rudeness in making our wants known, and urging you with importunity to relieve them. We have looked out for work in vain, we have gone here and there, and can find none; and when we leave our parish in the fruitless search, we are deprived of the little allowance which the parish gives us."

This letter is addressed to the Poor-law Commissioners, and is signed by thirty-two labourers, having seventy-six children, besides their wives, and who allege that there are about sixty more labourers in the parish who are as badly off as themselves, although not actually paupers.

Contrast the condition of these poor, honest, and industrious labourers with the condition of such of their numbers as had migrated into the manufacturing districts, and whose condition has been already described. In agriculture, the most fortunate amongst them could not earn more, with the labour of their children superadded to their own, than 15s. or 16s. a week. What where the wages of an operative, working in a factory, in which machinery of the most perfect kind was employed? In the mill of Messrs. Birley, Hornby, and Kirk, at Manchester, the following were the wages paid:—

	Spinners.			Weavers.		Number Employed.
	£	s.	d.	s.	d.	
Men	1	0	6	15	1¾	379
Women....	0	11	3½	9	7¼	563
Children ..	0	5	10	5	4½	634

This is in the cotton manufacture. In the woollen manufacture, in the neighbourhood of Leeds, the number engaged, at the period referred to, amounted to about 20,000, who, working twelve hours a day each, through six days in the week, earned upon an average:—

Weavers	14s.
Spinners and Slubbers	21s.
Dressers	21s.

The wages paid at Manchester and Leeds, or in their immediate neighbourhood, are, no doubt, higher than in places at a distance from them, to and from which the cost of the carriage of goods is greater, and where the articles of food are not so dear. Make a reasonable deduction for this, say ten per cent., and then, by however much the wages thus paid to the spinner and weaver were above those paid to the agricultural labourer, was the condition of the labourer improved, by the transfer of his labour from the field to the factory, in which factory he worked by the agency of machinery.* Nay, it was much better than it thus appears, if measured by the amount of his income, for women and children, as well as men, found employment in the factory. Suppose that a man, his wife, and two of his children, worked in the spinning-mill, his income would stand thus:—

Man	£1	0	6
Wife	0	11	3½
Two children . . .	0	11	8
Total . . .	£2	3	5½

This would be his weekly income; while, taking the year round, with all its advantages, the utmost that he could earn, as an agricultural labourer, with the additional labour of his wife and of four children, aged 14, 11, 8, and 5 years, respectively (the eldest being a boy), and in the favoured county of Sussex, was 16s. 6d.—*Report of the Poor Law Commissioners*, extracts, p. 43.

Bad as is the condition of the operatives, it is much better than that of the agriculturists, as these facts show; but even still more than by these, perhaps, is it shown by the strong repugnance felt by those who have migrated from the agricultural to the manufacturing districts at the idea of returning to their former localities, even when that is the only alternative afforded as a possible escape from the most severe privations, so long as those privations are believed to be of only a temporary nature. This is shewn in a fact stated by Dr. Taylor, in his tour through the manufacturing districts, during a period of great manufacturing depression. He says, after an appalling description of the distress and destitution he had witnessed in the families occupying eighty-three houses he visited at Colne, whose food consisted of oatmeal, with an occasional treat of skimmed milk, and whose furniture consisted of only boxes for tables and stools, and of pieces of carpet or canvas for covering, and of straw and shavings for beds—"On asking why application had not been made to the parish for relief, I was informed that they were persons from agricultural districts, who, on committing an act of vagrancy, would be sent to their parishes, and that they had rather endure anything, in the hope of some manufacturing revival, than return to the condition of farm labourers, from which they had emerged. This was a fact perfectly new to me, and, at the first blush, utterly incredible."—*Tour in the Manufacturing Districts*, p. 140.

These are the facts. How do they bear upon the question we are discussing? *i. e.*, the influence of machinery upon the condition of the labouring classes? Thus: they show that, but for the processes of manufacture carried on by a combination of mechanical and manual power, the people must have been starved down to narrower limits. It is quite clear, from what has been said, that the increasing population could not have found employment in agricultural industry, for, notwithstanding the immense drain that has been kept open to carry off the labourers from the agricultural to the manufacturing districts, during the last forty years, there still exists a much larger quantity of labour in the former than can be employed, while those labourers who are employed are obliged to

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* Just at the time this proof was passing through the press, the following appeared in the *Times* newspaper:—

"Sir,—I beg to send you the following facts relative to the wages earned by the operative classes of our town (Wakefield), which our landowners may compare, if they like, with the wages of the Goatacre and Dorsetshire labourers. If the statement does not remove the prejudices which they entertain towards the Lancashire cotton-lords, it perhaps may shame them into an alleviation of the sufferings of their serfs:—

	Wages per week.				
	s.	d.		s.	d.
Little piecers, 13 years old	6	6	to	7	6
Big piecers	9	6	—	10	6
Young women, as winders, weavers, or tenters	9	6	—	12	0
Spinners (men)	25	0	—	35	0

"Most of the cottages of mill hands are exceedingly well furnished, with mahogany four-post bedsteads, chests of drawers, and clocks, panelled oak-back couches, &c. Many of them have their rooms handsomely papered. At a recent public dinner here, several of the operatives sat with pint decanters of wine before them, and drank to the various toasts with all the *nonchalance* of gentlemen.

I am, sir, your obedient servant,
"A COTTON LORD."

"*Ashton, Januay* 12."

live upon almost starving wages.* Let us hear no more, then, of the comparative insignificance of manufacturing industry, or of the desirability of forcing down manufactures and forcing up agriculture.

We have seen the utter inadequacy of agriculture, even under a protective system, which adds thirty or forty per cent. to the price of our food, to give employment to the labouring classes, as proved by the constant course of emigration from the rural to the manufacturing districts. It is also shown by the gradual *increase of the poor rates* in the agricultural districts; for, although an occasional increase in the amount of relief required for the poor, in any particular district, will not warrant so broad and unqualified a conclusion as this, yet, where the increase gradually goes on, year after year, the conclusion is a perfectly just one. Now, the fact is, that if we take six of the chief agricultural counties, we shall find that they doubled their poor rates in thirty years. Here is the proof—

Counties.	1803	1830	1832
	£	£	£
Bedfordshire	36894	84541	77236
Buckinghamshire ..	86151	135239	144587
Essex	137140	282133	277663
Yorkshire, E. R....	41388	99500	105639
Berkshire	81994	111653	121217
Sussex	179858	256142	284686
Totals	563425	969208	1011028

More decisive evidence than this cannot be had or desired of the fact, that, notwithstanding the relief constantly afforded to the agricultural districts, by the transfer of large numbers of labourers to the manufacturing districts, they still had an increasing number of labourers for whom they could not find employment. Within the space of thirty years the poor rates in these six counties were doubled. What would have been the condition of the labouring classes there, had not the extensive employment of machinery afforded them occupation elsewhere?

CHAP. VI.—EFFECT OF IMPROVED MACHINERY ON WAGES.

Having demonstrated the fact, that it is to manufacturing operations that our constantly-increasing population is indebted for the means of subsistence, which agricultural occupation was utterly inadequate to furnish, the next thing to be ascertained is—"Do known facts warrant the conclusion, that successive improvements in machinery injuriously affect the wages and comforts of the working classes?" It has been already intimated, that it is not necessary, in order to disprove the allegation, that successive improvements in machinery *have* been injurious to the working classes, that we should be able to show that in no particular cases, either of occupations or of persons, have such been their effects. It does not follow that, because A or B has been injured, or because a particular occupation has been annihilated, by improved modes of production, that therefore the persons employed in productive industry have, as a whole, been injured. The injury done in particular cases may be balanced, where it occurs, by what has been appropriately termed the compensatory part of the process, by which any succession of losses to individuals is counterbalanced, at each separate act, by greater gains to certain other individuals, the individuals originally losing being themselves in the end involved—or very often so—if not to a perfect extent, yet to a very great and considerable extent, in the ultimate gains. The facts stated in a preceding chapter show how often men deceive themselves as to the immediate effects of improvements in machinery, even upon their own condition. The mistakes made in calculations touching these effects on the condition of others, are of course more frequent. One of the causes of such mistakes consists in confounding diminished payments for particular work done by improved machinery, with the gross earnings or wages of the workmen employed upon it. In a pamphlet on the corn and provision laws, by John Campbell, secretary to the executive council of the National Charter Association, intended for circulation amongst the least educated portion of the working classes, it is stated that improved machinery has constantly reduced wages; and, amongst other alleged proofs of the fact, the following is given, to show the average wages paid for the manufacture of "1lb. of 200 counts" of cotton thread, at various periods :—

1804. . .	7s. 6d.
1814. . .	6s. 8d.
1833. . .	3s. 5d.
1841. . .	1s. 7d.

The object of the statement is to induce a belief that the spinner has gradually lost the difference between 7s. 6d. and 1s. 7d., in consequence of the improvements that have taken place, from time to time, in the spinning machinery used. But such is not the fact, for though the price paid to the spinner for spinning the pound of cotton has been successively reduced, in the stated proportion, the whole quantity of cotton he has been enabled to turn off by the improved machinery has been proportionately greater. It seems to be a notion entertained by some of the opponents of machinery, that the operative should monopolize all the advantages arising out of improvement, as it takes place. In 1829, a strike took place at Manchester, on the introduction of Dyer's tube-frame, the manufacturers adopting it having proposed to reduce the price paid for spinning a pound of yarn, from 4s. 1d. to 2s. 5d.; and many thought the operatives right in resisting such a reduction. The men, as I have said, "turned out" against this invasion of "the rights of industry," and loud was the outcry raised against machinery, as the cause of the cruel act. But mark the facts :—By the use of the old machinery, the spinner turned off 312 lbs. of yarn in a given time, for which he was paid at the rate of 4s. 1d. per lb. By the use of the improved machinery it turned off in the same space of time 648 lbs. of yarn, for which he was offered at the rate of 2s. 5d. per lb., which would have been to him a clear gain, through the improved machinery, of £14 12s.; that is, 22 per cent. But he had got it into his head, that there was something unjust in requiring him to do more than double the quantity of work for an addition of only a trifle more than a fourth to his wages; and the strike of a large number of spinners was maintained for three months, at an enormous loss to themselves and families.

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* See the statements made by the labourers of Wiltshire, at the recent meeting held at Goatacre.

Mr. Babbage, in his work on the "Economy of Manufactures and Machinery," has stated some cases to show the increased production arising from machinery. They will show, also, that though the price paid per piece to the operative was, at each step in the series, less, the rate of earnings per week was not reduced, but, on the contrary, increased. "A machine called 'a stretcher' in cotton manufacture, worked by one man, produced as follows:—

Year.	Lbs. of cotton spun.	Roving wages per score.	Rate of earnings per week.
		s. d.	s. d.
1810	400	1 3½	25 10
1811	600	0 10	25 0
1813	850	0 9	31 10
1823	1000	0 7½	31 3

The same man, working at another stretcher, the roving a little finer, produced:—

Year.	Lbs. of cotton spun.	Roving wages per score.	Rate of earnings per week.
		s. d.	s. d.
1823	900	0 7½	23 1½
1825	1000	0 7	27 6
1827	1000	0 6	30 0
1832	1200	0 6	30 0

This shews, conclusively enough, how greatly those persons err who refer to prices in proof of the reduced earnings of the workmen. If we turn to the weaving department of the cotton trade, the like thing will appear to have ensued; that is, there have been, with increased production, a diminution of prices for quantity, with increased earnings in the aggregate.

So that, notwithstanding the almost astounding fact, stated by Mr. Marshall, *i. e.*, that the same quantity of work was, in 1832, performed for 1s. 10d. which was paid 16s. for in 1814, the increased quantity turned off by the workman has kept his earnings tolerably steady, with a tendency to improvement. That steadiness would, no doubt, have continued, but for other circumstances which have broken in upon it. No doubt the labour is somewhat more severe than it was, in consequence of the incessant and ever-vigilant attention that must be given to the mechanical process. The steam-engine is a severe task-master; it allows of no relaxation—not even for a moment—during the hours of labour. But the evil is not in that so much as in the protracted periods of labour, and the gradual inroads that are being made upon the earnings of the operatives, not by improvements in machinery, as we have seen, but by some other cause or causes, in no way connected with that. Had the diminution in the sum total of the spinner's or the weaver's earnings been occasioned by the improved machinery by which he worked, the two things would have been coincident in point of time; but, as we have seen, they were not so; and to trace any connection between them may be very safely defied.

The cotton trade has been referred to in illustration of the argument; but the same thing will be found, to a lesser or a greater extent, in all other trades into which machinery is introduced. In point of fact, the law which universally regulates profits, must compel the capitalist to give his workmen a share of the profits resulting from the improved machinery. To take all the advantages to himself would be to raise his profits above the ordinary rate of profit; and as soon as this had been effected, fresh capital would flow into the trade, and other masters, to get a share of the high profit, would offer the work-people higher wages.

It is not meant to be said that there always has been a clear gain in the aggregate payment of the operatives' labour, although a reduction in the payment per piece, through the improvement that has taken place in machinery. All that is meant is, that such has generally been the case, where there have not been other and adverse causes operating upon the labour market. In other words, it is averred, that the tendency of improved machinery is not in itself, and has not been, to reduce the incomes of the working classes. Such, in fact, could not possibly be the effect of it, unless we can suppose that manufacturers are continually sinking capital in new and improved machinery, for the mere good of the public, and without reference to their own profits—a supposition not within the compass of probability. If any additional gain or profit accrues from the improved process, the workmen must share in it. The agency of competition ensures this, by some such operation as the following:—The fresh capital invested must be content to realize a lower rate of profit, in order to extend the market. There is an increased supply, and a consequent fall in prices, which leads to an increased consumption. The demand for labour necessarily varies with the enlarged demand for the articles produced, for they cannot be produced without it; and the inevitable tendency of this must be to prevent wages falling, if not to cause them to rise. There may be, as it has been already remarked, other causes in operation, tending to depress wages, and actually causing them to recede; but that is altogether another question, and in no way affects the one now under discussion.

Wages have fallen in work done by machinery, but so they have in work done by manual labour; in both from like causes, no doubt, the chief cause being this, that the extension of the field of industry has not kept pace with the increase of the population. The distress arising out of reduced wages is not confined to the operatives of the manufacturing districts; nor has it been occasioned by an irruption from those localities to others in which it prevails. In the metropolis, for example, the price paid for making a policeman's trousers is 5d., while shirts are made for 9d. a dozen; yet neither of these articles is made by machinery, nor have the persons employed in making them been reduced to the necessity of so doing by the improvements in machinery.

It is, in point of fact, impossible to discover any natural connexion between improved and cheapened process of production and falling wages. The natural consequence of an improved and economical application of labour would seem to be the opposite to this, and that, no doubt, would be realized, were there no disturbing influences at work to interfere between cause and effect.

CHAP. VII.—MACHINERY CREATES A DEMAND FOR MANUAL LABOUR.

To hear some persons talk of the effects of machinery upon the condition of the labouring classes, it might reasonably be inferred that some power had been discovered by capitalists, by which they would create and work the machinery they employ for productive purposes, without the aid of human labour.

At an agricultural dinner some time since held in Berkshire, to entertain the kind-hearted but short-sighted Earl of Stanhope, the chairman assigned the employment of machinery as the cause of manufacturing distress, and spoke of that power in terms which might fairly warrant a belief in those who confided in his representations, that nothing is required in the present state of machinery but to put a fleece of wool or a bundle of cotton into a machine, and receive it back a well-manufactured coat or a fashionable gown. Such a belief may be too absurd for general reception, but not a few are infected with a belief, almost as absurd, namely, that the employment of machinery in manufacturing business, tends to diminish the demand for human labour.

All the facts that have been stated relative to the increase that has taken place in the population of manufacturing towns and districts, show that such cannot have been the case. The manufacturing population has increased much more rapidly than the agricultural, and even than the general population of the country; which shows clearly enough that the application of machinery to manufactures has not had the effect of lessening the aggregate amount of employment of the working classes. In point of fact, almost everybody knows, although many strangely overlook the fact, that the machine, while it performs an herculean task, creates an infinite variety of employments, whose combined power nearly equals its own operative production, and which cannot be performed and sustained without the attendance, preparation, and assistance of innumerable attendants.

It seems almost surperfluous to add anything further upon this point; but we will mention one very striking fact, out of a large number that might be adduced. In the first report of the Poor-law Commissioners is one from Dr. Kay, dated June 22, 1835, in which he enumerates the steam-power which had either recently been erected, but was not then supplied with hands, or which was to be erected within the following year and a half, or two years, in the cotton districts of Lancashire and its immediate vicinity. It appears, from the facts stated in this report, that 7,507 horse power was about to be erected, and brought into operation in this district alone, in the course of two years from June, 1835. "Ah," say some of the antagonists of machinery, "thus it is that the labour of those whose subsistence depends upon their employment is superseded, and iron and steam are made to do the work of human beings." But how stands the fact? "Within whatever period this power is brought into complete activity," says Dr. Kay, "six mill hands, at least, will be required for every horse power." On the introduction of this power depended the employment of 45,042 mill hands; and if we take into account the unemployed members of the families of mill hands, as well as mechanics, labourers, handicraftsmen, warehousemen, dyers, calenderers, finishers, shopkeepers, &c.; in fact, the whole population necessary to complete the said fabric, of which these 45,042 mill hands would form a part, we must add an equal number. The erection of this steam-power, or machinery, therefore, so far from displacing human labour, or throwing persons out of employment, would place in immediate relation with itself a population of 90,084 persons.

But, in addition to the demand for operatives, which this new machinery would thus create, look at the employment it would furnish in its erection. The outlay in buildings and machinery necessary to bring this power into operation, is estimated at £500 per ten-horse power, without taking into account the capital necessary employed in trading transactions in connexion with the power; or, in other words, the erection of this power presupposes an outlay of £3,753,500 in buildings and machinery; which outlay is made upon the working classes, by whose hands the buildings are raised, and the machinery made. Let me, to strengthen this position, refer to an admirable little work, translated from the French of Leon Faucher, with notes, by a member of the Manchester Athenæum. It is to the notes that I would refer for some clear and unanswerable reasonings touching the economies of machinery, as applied to the purposes of manufacture; but the text of M. Faucher supplies some facts which illustrate, in a very striking manner, the great extent to which the field of industry has been enlarged, and, therefore, employment created for the industrial classes, by the extension and improvement of mechanical power. Thus, whilst the number of inhabitants of the county of Lancashire increased from 300,000 to 1,667,000—drawn thither by the sources of employment which the improvements in machinery opened up—the inhabitants of Manchester increased from 40,000 to 306,000. In 1792, when Arkwright formed those projects which seemed to authorise the greatness and rapidity of his fortune, England did not import annually 30,000,000lbs. of cotton wool; the products of the manufacture were estimated at from £3,200,000, to £4,000,000, and employed fewer than 100,000 hands. What is the state of the manufacture now, notwithstanding its restrictions and depression, through the operation of absurd and unjust commercial laws? The importation of cotton wool has increased from 30,000,000 lbs. to more than 600,000,000 lbs.; the value of the products have increased, notwithstanding the continual reduction of price, from £3,200,000 to £36,000,000, while the various classes of the operatives constitute 75 per cent. of the whole population of the borough. And so of the other great seats of the cotton manufacture, where the population has enormously increased within the last quarter of a century. In Salford, the operatives constitute 74 per cent. of the population; in Ashton, 81 per cent.; in Staleybridge, 90 per cent.; and in Dunkenfield, nearly 95 per cent. Thus has the population of the agricultural districts, unable to find employment in the places of their birth, and in the pursuits to which they were born, migrated to those parts of the country where the processes of manufacture, aided and augmented by mechanical power, have opened a wide field for the exercise of their industry, and supplied them with the means of living.

It was stated in the *Manchester Guardian*, the other day, that the Mersey cotton-mill, in Heaton-lane, had recommenced work, after a stoppage of eighteen months. Surely the bringing into operation of so much additional machinery as these mills contain, must greatly injure the labourers in the district and trade to which they belong? No. The re-employment of this machinery, which had been lying idle for eighteen months—which had for that space of time produced nothing which the skill and hand labour of man might have produced—gives occupation to upwards of *one thousand* hands. The same journal also stated, that the large establishment in Chestergate, last worked by Mr. T. S. Knowles, which had been standing idle since 1842, was likely to be again brought into work, which, instead of throwing labourers out of employment, would afford occupation and wages to upwards of *seven hundred* hands.

I have already stated that inanimate agencies, such as steam, air and water, joined to machinery, do the work of some 600,000,000 of labourers in Great Britain alone. Are there, then, fewer labourers in the kingdom now than before machinery was so largely employed? On the contrary, who does not know that the population has more than doubled itself? Monsieur Say calculates that, by the invention of printing, a *thousand* copiers of MSS. were thrown out of employment. But, then, look at the compensatory power of the machinery which has been introduced for printing, by which these copiers were displaced. More than a *million of persons* are now employed in the various processes connected with printing; and their numbers are every year augmenting. Lord Monboddo contended that the plough, by superseding spade cultivation, was the most pernicious invention ever made. This world would be a rare place, if such people had the management of it. They are confident enough in themselves, and, with Sir Godfrey Kneller, think that things would have been better ordered had they been consulted at the creation; but for all real emergencies, or even for ordinary practical measures, they are, of all persons, the most inefficient.

Look, say some such acute reasoners, look at what an immense number of persons the cotton trade, for example, would employ, were machinery dispensed with, and manual labour only employed. This has been answered in part already. Let us just add, that the reasoning is based upon the merest fallacy. Had it not been for the machinery we should have had *no* cotton trade. Even *with* the aid of machinery in an imperfect state, the trade could afford employment to but about 50,000 in the United Kingdom. As the machinery has been improved and extended, these numbers have increased to 500,000. "Experience has proved," says Colonel Thompson, "that when the production of any commodity is facilitated by machinery, the increase of consumption consequent on the reduction of price, in a state of freedom, and under the existing circumstances of the world, in respect of the desire to consume, is such as in the end to increase the demand for labour in the production of that particular commodity. If power-looms could bring down the price of broadcloth to a shilling a yard, and the corn of foreigners might be taken from them in return, so many people in different parts of the world would wear broadcloth who now do not, that there would be more employment for makers of broadcloth in the end than ever. If men cannot exchange the cloth because the agriculturists will not let them, the case is certainly altered. But then the fault is not in the machinery."

Is it not astonishing to find men, with these and numberless similar facts staring them in the face, gravely contending that machinery *displaces* human labour, and militates against the interests of the poorer classes. Let us hear what the translator of M. Faucher says upon this topic. It will be found that his reasoning is strongly confirmatory of what I have advanced.

"A mechanical improvement will sometimes diminish the number of hands required in the particular department of industry into which it is introduced, but this is not always the case. In many instances the increased cheapness induces so great an extra demand for the article, that, even with the aid of the new improvement, a greater number of hands is required. Yet there are not wanting parties who continually insist that machinery competes in the labour-market with manual labour; and that, in proportion to the advance of mechanical improvements, manual labour is depreciated. The Socialists perseveringly assert this position; and their leader, Mr. Owen, has often declared that such is the effect of machinery in throwing manual labour out of the market—that if our national debt were cancelled, and all our financial burdens taken away, we should speedily be reduced by the advance of machinery, to the same state in which we now are. And this position has also met with a full share of patronage from those admirable economists, the leaders of the tory party, who (whenever it has served their purpose) have delighted to attribute to machinery the evils of a restrictive policy. The continual increase of the manufacturing population is a decisive answer to those who maintain that machinery diminishes the *general* demand for labour in the market. Where there is much machinery, there are always higher wages than in those districts where little machinery is employed.*

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* Witness the contrast in the condition of the wretched Hindoo, who manufactures cotton with the rudest machinery, and that of the operatives in

The immediate effect of mechanical improvement is an increase of productive power, and as wages are the labourer's share of the production, they rise (other things equal) in proportion to the degree in which the capital and machinery of his employer makes his labour productive. High wages cannot possibly exist where the productive power is small; and the productive power of the labour is at its *minimum* when unaided by contrivances (such as machinery) for economising labour. The cheapest labour is that which yields to the employer the largest production in a given time, and it is only when production is largest that wages are highest. Really cheap labour, therefore, yields the best profits to the employer, and the highest wages to the labourer. No one will dispute that skill and industry are to be desired in labour. But machinery multiplies the skill and industry of the labourer a hundred fold; and it would be, therefore, as irrational to oppose the progress of machinery as it would be to oppose the progress of industrious habits and of skill amongst the labourers, on the ground that if the labourer were not so skilful or industrious, additional hands would be required to produce the same amount of work. Again: whatever may be the amount of machinery concerned in the production of an article, its cost is determined solely by the *manual labour* employed in its production. Mechanical power never did, and never will cost mankind a farthing more than the *manual* labour employed in its development. Previous to the inventions of the present and last centuries, the cost of an article was the amount of the *manual* labour bestowed on it, and it continues to be so now, and ever will continue to be so, no matter how great the extent to which machinery may progress. If an invention causes half the hands of a certain manufacturer to be thrown out of employ, it at the same time throws half the capital out of employ also. There is no less capital in the market after the invention than before, and there is no more labour in the market after the invention than before. The proportions of capital and labour remain the same, and wages cannot be permanently lessened by the invention."

So much for the allegation, that the employment of machinery operates injuriously to the working classes. Look at the question in what light soever we may, the contrary is seen to be the case. The faculty of invention, in which it makes its source, is one of Heaven's best gifts to man. Like all other boons, it is capable of being misused; but they who would deny its exceeding value, give but poor evidence of their rationality.

CHAP. VIII.—WHAT WOULD THE PROHIBITION OF MACHINERY DO?

It is astonishing to find that really intelligent and thinking men are sometimes led into the preposterous notion, that machinery does injury to the majority of the people, and that its annihilation would be a blessing to the world. The following passages, from the evidence appended to the report of the Import Duties' Committee (1840), will tend to dissipate this error, and to show that the suppression of machinery would not abate, but, on the contrary, seriously aggravate, the sufferings of the working classes. It is from the evidence of Mr. Joseph Whetstone, a woollen and worsted manufacturer of Leicester:—

"3338. 'In what proportion were the manufacturers employed last winter?' 'It is difficult to arrive at an exact calculation; but from one-third to one-fourth of the whole of the weavers, and of those dependant on them, were out of employment from November till May.'—3339. 'Do you attribute that want of employment to the cessation of the demand from the United States; although the whole amount of your exports does not exceed from a seventh to a tenth of the whole amount of the manufacture?' 'It was the absence of *the home trade.* The home trade ordinarily commences in August, and continues up to March.'—3340. 'Have not the agricultural labourers been well paid during the high price of provisions, and have they not been able to consume their usual quantity of those goods?' '*Certainly not.* It is a matter of surprise to me; but those hosiers who send their travellers through *the agricultural districts*, complain *that the demand has fallen off* as much in those purely agricultural districts as it has in the manufacturing districts. I ought to say that the manufacture of worsted and woollen stockings is almost entirely dependent for its demand upon the well-doing and well-being of the working and industrious population of this country, and those immediately connected with them; it is not an article of luxury supplied to the higher classes, but it is an article of necessity to the working and middle classes.'—3344. 'To what do you ascribe the diminished demand for those goods?' '*To the high price of provisions, which has diminished the means of the labourer to purchase; because, if his food takes a larger proportion of his wages, it leaves him less to lay out in clothing, and furniture, and other articles.*'—3434. 'In speaking of the consumption of Leicester manufactures, you say that the market has been falling off for these two years; are the committee to understand that that has been from the increasing poverty of the industrious classes of *the country*?' 'I imagine that to be the case.'—3435. 'Have not also the artizans been obliged to give more labour, and to do more work for the same wages, in consequence of the pressure which has existed in Leicester?' 'Certainly; wages have been lower in consequence of it.'—3436. 'Consequently, the situation of the artizans in every way has been and is more uncomfortable?' 'I never saw anything like the distress which there has been of late amongst the artizans employed in the stocking manufacture of Leicester.'—3440. 'Are you quite certain that the falling off in the demand for Leicester manufactures, amongst the purely agricultural population, has been as great as among the manufacturing population?' 'The falling off has been as great; the hosiers that travel there tell me that the wages of agricultural labourers are so low, that it leaves them nothing to lay out in manufactures; they have first to obtain the necessaries of life, and it leaves them nothing to lay out in stockings.'—3441. 'Then, although the price of food has in-

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our manufacturing towns. The one earns about 5s., while the other earns 1½d.

creased, their wages have not increased in proportion?' 'Certainly not; in the agricultural districts, and in the manufacturing districts, wages are lower than they were two years ago.'"

It is difficult to say what sort of a reception would be given to one of those political economists, who propose to mitigate or remove the distress by taxing machinery, and thus to make the manufacture of stockings, for example, more costly, and their price of necessity higher than now, if he were to show himself amongst the stocking-makers of Leicester or in the agricultural districts spoken of by Mr. Whetstone. It would depend, no doubt, upon the degree of intelligence prevalent amongst his auditors. But nothing is more certain than this, that neither would the stocking-makers get more food, nor the agricultural labourers more stockings, by enhancing the price of them through the prohibition of machinery.

CHAP. IX.—THE TAXATION OR MACHINERY.

Time was, and not long since, when men were to be heard, declaiming against the use of machinery, and insisting that wherever it "came into competition with human labour," it should be put down. As if all machines for facilitating production did not come into competition with human labour, from the spade and the axe to the complicated mechanism of a cotton factory. We have now got beyond that point, and a tax upon machinery is the utmost that is insisted upon by those who deem mechanical power hostile to the interests of the working classes.

The object proposed by the advocates of machine-taxing is not avowedly to abridge or restrain the use of machinery, much less to put it down in the gross, but only to "adjust the burden of taxation, so that it may operate to the relief of the poor."

"Machinery," say they, "requires no food, and it, therefore, pays no taxes upon consumption as the human labourer does, in the purchase of everything he eats, and drinks and wears;" and the object of the tax proposed is, to compensate for the indirect taxes thus paid by the labourer. It is, in fact, intended to place the human machine and the inanimate machine upon what is deemed to be an equality. But who can fail to perceive that whatever may be the avowed object of the authors of this project, the real object is to abridge the use of machinery? To raise the cost of the products of machinery, is to diminish the amount of those products; and this is, in truth, the only way in which those who propose it, anticipate that a tax upon machinery will operate. It is by making production by machinery as costly as production by human labour, that they expect to take away a portion of work from the one, and transfer it to the other. It is an effort, therefore, to repress the use of machinery by an indirect and a covert process. But to repress the use of machinery is to diminish production, and thus to deprive society of a portion of that of which it has not at present more than it requires. If mankind would agree to return to the state in which men lived in the early stages of civilization, then, indeed, they might dispense with some of the more complicated and productive pieces of machinery. But then they must wear coarse, unsightly clothing, live in rude and comfortless houses, and feed upon little beyond the spontaneous productions of nature. This is not what the advocates of the tax mean, although their project, if realized, would lead us towards it. Machinery has, beyond all doubt, materially increased production of all kinds; but still we have in the aggregate no more than sufficient for the supply of our wants, and occasionally too little. To diminish the existing power of production, therefore, is identical with increasing the tendency to starvation. The taxers of machinery desire to obtain produce without the slightest reference to the laboriousness of the process by which it is to be obtained. The produce of the land might, no doubt, be increased; by digging rocky ground, and manuring barren heaths, corn may be grown where none is now had. As Colonel Thompson has humourously remarked, corn might possibly be grown upon flag-stones. But the question is, whether the labour expended would be repaid by the produce obtained—whether the ten hours' toil expended in forcing a given quantity of corn from inferior land, would not, if applied to the production of some article which the use of machinery facilitates, give what would have twice as much exchangeable value, and which, if corn were wanted, would exchange for double the quantity the same labour would raise? The truth is, that, in this country, we have long since passed the limit of the practicability of subsisting upon manual labour—that limit being created by the natural fertility and extent of the land. Those who talk of taxing machinery, as the means of substituting manual labour in its place, talk as if we could increase land produce in proportion to the labour applied to the land. In any other sphere of production, almost, this may be done; but not in land production. On all soils not naturally fertile, or already cultivated to a certain extent, the increased expenditure of labour and capital will produce a continually diminished return; whereas, in manufactures, by doubling the capital employed, we may double, perhaps treble, the quantity produced. This difference in the power of labour, as applied to the land, and as applied to other sources of production, seems to be wholly lost sight of by the advocates of a tax on machinery, which means neither more nor less than the substitution of manual labour for machinery; and hence the blunders they are perpetually making. The wants of the country have already exceeded the territorial means of supplying them, by at least the fifty or sixty millions worth of manufactured goods annually exchanged for commodities from foreign lands; to say nothing of the extent to which the commodities consumed at home are produced by machine-power, not a tithe of which commodities could be produced without it.

The out-cry occasionally heard about "over-production," and about "over-production being the cause of the distress," is one of the most ludicrous things imaginable. It may be, and it is, true enough, that some of the goods now produced cannot be sold; but that is not because there are too many goods produced to supply the wants of mankind, nor because there are not customers ready to purchase. It is because those holding the goods are prohibited from selling them to those who want them; or, what is the same thing, they are prohibited from taking in payment the only things those wanting to purchase have to dispose of. And this prohibition exists, moreover, while *we* are as much in want of the commodities they have to to dispose of, as they are in want of what we wish to get rid of. There are large quantities of surplus commodities on each side, and the desired interchange is interdicted! Strictly speaking, there never can be a permanent excess of production, for that must be, sooner or later, in proportion to the demand. But the demand, in consequence of the unlimited nature of our desires, is always on the increase, which makes it next to impossible that production should ever become redundant or excessive. It is the means, and not the wants or desires, of mankind that limit demand. If dress, and luxuries in food or equipages, are not in demand, it is because people have not the *means* to purchase —the means being some equivalent, as required labour or its product. If a man is without food or clothing, it is because his productive means fail him. Open a channel for his labour, or for the products of his labour, and he will have wherewithal to purchase the productions of others. Production increases production, and is the source of all national wealth.

CHAP. X.—CONDITION OF THE HAND-LOOM WEAVERS.

The case most commonly referred to, as furnishing proof of the injurious effects of improved machinery on the condition of the working classes, is that of the hand-loom weavers, whose reduced and pitiable condition has been fully shown in a variety of ways. The number of adult hand-loom weavers in the United Kindom is, probably, somewhere about 250,000, and their earnings have been reduced from what was at one time a competency, down to a sum, which, if not increased by the labour of their wives and children, would be wholly inadequate to supply a family with even the smallest amount of the bare means of existence. This deplorable fact is admitted; the question is, whether improved machinery is to bear the blame of it.

It may be deemed unnecessary to discuss this question, after what has been said upon the general subject of the compensatory power of machinery, inasmuch as the displacing of the labour of the hand-loom weaver, by the application of an improved mechanical weaving apparatus, however deplorable in its immediate, or even in its permanent, consequences to the displaced individuals themselves, might be quite compatible with the improved condition of the working classes, as a whole. The invention of printing was, no doubt, injurious to the copyists, who, as exercising a lucrative profession, were exterminated by the introduction of the new mechanical art. The invention of the threshing-machine was equally injurious to those who made flail-threshing one source of their subsistence. And the same thing may be said of the effects of the new processes of manufacture, which have displaced "shearmen" in the woollen trade, and "flax-dressers" in the linen trade; with numerous other occupations or professions.* But to admit this, is not to admit that these new inventions, by which the classes, *as classes*, have been injured, have been injurious to the working population at large; nor even ultimately injurious to those who have at first suffered from them.

But, not to insist upon this view of the question, it is by no means so clear as is generally thought, that the deplorable condition of the hand-loom weavers has been brought about through the introduction of the power-loom.

There is something very peculiar in the case of the hand-loom weavers, which induces strong difficulties in the way of deciding on the precise cause of their distress. The hand-loom weavers were in a very wretched condition long before the use of the power loom.

In 1799, no fewer than 500,000 persons connected with this occupation were represented in a petition to Parliament, setting forth the miserably low rate of their wages, and praying for the protection of Parliament, in their state of "distress." In 1808, Mr. William Ratcliffe, one of the inventors of the dressing-machine, and intimately acquainted with the manufacture, was examined by the Committee of the House of Commons, appointed to inquire into the claims of the Rev. Dr. Cartwright, the inventor of the power-loom, to a public reward, when he made the following statement:—"To that part of your question, whether I think the general adoption of the loom by power will operate to the prejudice of the weavers in the old way, I answer, No. In the first place, their situation has been such, for the last 12 or 18 months, that it cannot be made worse; as, during that time, generally speaking, they have neither been able to pay rents, nor to buy themselves clothes; all their earnings have barely been sufficient to keep them alive; and men, who have families to support, are obliged to work from 16 to 18 hours in the day to do this."

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* There is a great inconsistency in all the reasoning advanced against improvements in machinery, as being injurious to the labour classes. The power-loom in weaving, and the mule in spinning, are said to have displaced manual labour, to the prejudice of the operatives. But has not every machine, however simple, done the same thing? If the only object be to give *employment* to the people, let us break up all our machines, from the spade to the steam engine, and dig, as well as spin and weave, after the primitive fashion, before machines of any kind were thought of. But no; the opponents of machinery would not go that length, although they do not exactly know where they would stop short of it. They object to the "mule," because "it supercedes human labour;" but so also did the "jenny;" yet they do not propose to go back to the use of the distaff and one-handed spinning wheel. They assail the "power-loom," because it has reduced the value of the "hand-loom;" the hand-loom, however, was as great an improvement upon the old and rudely-constructed weaving apparatus, which may still be seen in India, and by the use of which a weaver might perhaps earn 1s. per week, as the power-loom is upon the hand-loom. All the arguments against improved machinery rest upon mistaken or limited views of the facts involved in the question.

This distress was not temporary merely. From 1808, when this evidence was given, down to 1818, when there were not more than 2,000 power-looms in Lancashire, the hand-loom weavers were exposed to similar privations. The use of the power-loom down to this period was too limited to make any material impression on the market price of cloth; nevertheless, the price paid for weaving a particular fabric, in the woollen trade, varied in the following proportions, according to the Lords' Report, of 1814:—

	s.	d.
1792	8	0
1802	10	0
1808	5	6
1809	9	0
1811	5	6
1812	6	6
1813	8	0
1814	10	0

Now, as but few power-looms existed in 1808, and not many, compared with the number of hand-looms, in 1811, the fall of wages, at these periods, respectively, cannot be attributed to the use of the power-loom. But, besides this, it is observable that notwithstanding the gradual introduction of the power-loom, up to 1814, the wages for weaving the particular article referred to, had risen, at that time to 10s.

All these facts are irreconcileable with the notion that the wages of the hand-loom weaver were depressed, and finally reduced to their present deplorably low rate, by the employment of the power-loom.

Another fact to be noticed here, is this, that the power-loom is improperly represented to "come into competition with the hand-loom," inasmuch as it cannot be profitably applied, and is not applied, therefore, to the production of the particular descriptions of articles upon which hand-loom weavers are employed. The power-loom is not applicable to figured nor to fine articles—"fancy goods," as they are termed. The necessity there is for constantly changing the shuttles, for the production of any figured or cross pattern in silks, and the increased breaking of the fine yarns, in cotton and worsted, render the use of the power-loom unprofitable in the production of any but the commoner and stronger tissues, whether of cotton, linen, woollen, or silk.

After the statement of these facts, it will not appear strange that there has been no reduction in the number of hand-loom weavers, in consequence of the increase that has taken place in the number of power-looms. Mr. Babbage states, from information gathered to be laid before Parliament, that, in 1830, the number of hand-looms in use, in Great Britain, was 240,000 and that nearly the same number existed in 1820; whereas the number of power-looms, which was only 14,000 in 1820, was increased to 55,000 in 1830. The number is now much larger.

But this fact, though quite consistent with what has been said here, is wholly inconsistent with the assumption, that the hand-loom weaver has been brought down to his present position by the operation of the power loom.

Another striking fact was stated to the committee of 1834, by Mr. Makin, a manufacturer of Bolton. It was this, that there is often a demand for thousands of hand-loom weavers, beyond the number that can be obtained; but that, notwithstanding this, their wages never rise. This fact, which is seemingly at variance with the ordinary law of supply and demand, is supposed by Mr. Porter (Progress of the Nation) to be accounted for on the assumption, that when hand-loom woven goods can be furnished within a certain price, they admit of an extensive sale; but that when that limit is passed, other goods, of home production, or foreign goods of similar make, come into successful competition with them. If this supposition be well founded, then, and to that extent, the hand-loom weavers are certainly affected by the use of the power-loom, since, but for this, no such limit would exist as to the price obtainable for their productions. I do not think, however, that Mr. Porter's mode of accounting for the phenomenon is of any value. If it were, it would hold good in other branches of industry, which is not alleged.

Looking carefully at all the circumstances of the case of the hand-loom weavers, I am strongly disposed to think that the deterioration that has taken place in their condition, as compared with what has taken place in the condition of other classes of operatives employed in the staple trades of the country, is attributable, almost exclusively, to the nature of their employment, and the comparative facility with which the lowest class of labourers may transfer their labour to it. Common weaving is an employment to which unskilled persons, and even young children may readily adapt themselves If the power-loom had never been invented, there would, no doubt, have been a demand for a greater number of hands for the hand-loom; but what reason is there to believe that the greater number would not have been forced to work at wages equally low as those now paid?

From an analysis of an inquiry into the condition of 10,000 families of the working classes in Manchester, made in the spring of 1840, and published by Mr. Ordshead, it appears that of 6,978 hand-loom weavers, no fewer than 4,157 were Irish, or their immediate progeny; while of 38,613 persons employed in other and more skilled branches of industry, only 15,642 were Irish, or their immediate progeny. It is computed that there are, in Manchester and its immediate neighbourhood, 60,000 Irish,* or their immediate descendants, a large proportion of whom depend upon weaving for a living; and if any additional number had been wanted, they would doubtless have been there. The wretched condition of the labourers in Ireland has not a little to do with the condition of the hand-loom weavers here.

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* Dr. Kay estimates the number of Irish employed in the cotton trade, in Lancashire, at 150,000, or 160,000.—Poor-law Report, i. 305.

CHAP. XI.—ANTICIPATED RESULTS OF MACHINERY ON THE LABOURING CLASSES.

A question, more curious than useful, has been raised, touching the capabilities and possible application of machinery in future times, and the effects of these on remote generations. "Self-acting" machinery is sometimes spoken of in terms which, as I have already said, would induce a belief that the speakers are possessed with a notion, that, if not yet arrived, the time is not far distant, when it will be only necessary to put a fleece of wool, a bundle of cotton, or a skein of raw silk, into the machine, and receive back a well-formed coat, a parti-coloured gown, or a figured shawl. It might be hazardous to pronounce positively upon the limit of mechanical capabilities, or to say what may or may not be done at some future time, in the strides that mechanism and science seem destined to take. "Although," says Mr. Babbage, "new machinery causes an increased demand for skill in those who make and repair it, and in those who first superintend its use, yet there are other cases, in which it enables children and inferior workmen to execute work that previously required greater skill. In such circumstances, even though the increased demand for the article produced by its diminished price should speedily give occupation to all who were before employed yet this very diminution of skill required, would open a wider field for competition among the working classes themselves."—(Economy of Manufactures, p. 336.)

Mr. Gaskell takes a similar view of the question. He says,—

"Whoever is in the habit of visiting the workshops of the machine-makers, and the mills of the great cotton manufacturers, from time to time, cannot fail to be struck with the incessant improvements in the application of machinery These improvements, though they may not enable the master to dismiss any of his hands, prevents the necessity for engaging fresh ones, though he doubles the productive powers of his mill. .... It is here that machinery threatens the manufacturing population. ......The time, too, must come, though it cannot come very quickly, when the cotton trade will reach its maximum. Great Britain will long retain her pre-eminence as a manufacturing country, in consequence of the progress she has already made, which places her immeasurably in advance of the whole world. ...... In retaining this, however, the population engaged in the manufacture will have to suffer greatly. Other nations in their turn will devote their energies to the same purpose : and though their present inferiority as to roads, canals, skill, and enterprise, combine to render their competition not very formidable, this will not long continue. ...... The period is not very remote, when powerful rivals will dispute the ground with Great Britain, and compel her manufacturers to adopt such measures, and to lower the value of human labour to a level that will enable them to meet upon equal terms, the foreign trader. ...... The surplus hands would readily enable them to lessen the rate of wages, but, ... they prefer the slower process of mechanical improvement, by which, though they may triple the production, they require no new men, But these improved applications of mechanism will not end here. Whenever the pressure of foreign or domestic competition becomes more severe, the masters will be necessitated to avail themselves to the utmost of everything which can assist in lowering the price of their products, and human labour must and will be pushed to the wall. Many great changes will, of course, take place before this inevitable result is gained, and reduction in wages for quantity will be constantly progressing; but the ultimatum is less remote than those interested in it are aware of, for let it be remembered, that all mechanical applications, and the moving power derived from the expansive nature of steam, have as yet arrived but at one point in their career, and this point says nothing as to what may be done. There can be no question whatever that many processes, for which the human hand is at present indispensable, will very shortly have machines adapted to them, that, if they will not quite displace the workmen, will render one man capable of producing, or rather of superintending, the production of quantity now requiring ten or twenty labourers. .... It does not follow that improvements in machinery, or even new machines, would at once throw out a number of hands. Those, however, who argue that machinery never has that effect, and never will have it, either wilfully delude themselves, or take a very limited and imperfect view of the subject. It must have one of two effects, the object of every change, addition, and improvement, being to lessen the amount of labour required for production, and this must be either to render fewer workmen necessary to produce a given quantity of manufacture, or so far to lower the price of the manufacture, as at once to increase the demand for it so considerably as to absorb the same number of men as are already engaged in it. In many instances, in fact, generally, the latter has been the case hitherto, and would, perhaps, continue to be so, were Great Britain entirely to monopolise manufactures. But this cannot be, and as it has been before stated, the maximum must be attained. All these improvements having, therefore one end, all tending to the same point—namely, the cheapening of labour, the time must come when its value will be so small, as to make it nearly worthless to the possessor."—(Manufacturing population of England, p. 332—341).

This view of the tendency of mechanical science, is, no doubt, a very gloomy one; but, if it should be even well founded, it furnishes no good reason for refusing to make the best of our present position. On the contrary, it should give additional weight to every rational project for improving it. Granted that the time anticipated by Mr. Gaskell will assuredly arrive—the time "when our manufactories will be filled with machinery, impelled by steam, so admirably constructed as to perform nearly all the processes required in them, and when land will be tilled by the same means," so that "the people, emphatically so called, who have hitherto been considered the sinews of a nation's strength, will be even worse than useless ;" still there is nothing in the fact to induce us to anticipate the evils it is to produce, by voluntarily circumscribing the field of productive industry, and shutting against ourselves the markets in which our productions are, and for years to come will be, in demand. Colonel Thompson has remarked, somewhat humourously, but not the less convincingly on that account—

"Suppose a time should come when everything could be made by machinery without cost, and add, if you please, that agriculture should be improved till corn could be got for the trouble of shovelling up, as sea-sand might be. Setting aside the ridicule of discussing a case so manifestly impracticable, what would the result be, after all, but something like a return to the state of man in Paradise, where food was to be had for gathering, and clothes, if they did not hang on every bush, could be done without, which comes nearly to the same thing. But the working classes will say, they would not be asked either to eat or wear. Who, then, is to do either? Are the landlords to grow wheat without limits, and the numerous classes not eat it—nor, of course, pay for it? And are the manufacturers to multiply garments to infinity, and the numerous classes not wear? The thing will not hold water. The fear is altogether a false alarm."—(Works, vol. vi., p. 169).

But there are two or three considerations that may tend to diminish the probabilities of all these gloomy anticipations.

In the first place, England, not less by the inventive skill and indomitable industry of her population than by her natural resources—her illimitable fields of iron and coal—seems destined by Providence to be always foremost in discovering and developing those great branches of industry which absorb so large a proportion of the human labour which the country contains. The history of the cotton manufacture is one, the magnitude of which almost overwhelms and confounds us; but who shall pronounce it to be unlikely, that, long before that branch of our manufactures shall be ruined by having its products shut out from foreign markets by the native products of the countries now consuming them, some other great national branch of industry may not have become developed, which, by employing machinery of a more nice or complicated kind than the machinery used in spinning and weaving, will demand all the human aid that can be found to keep it in operation.

In the next place, it should be borne in mind, that any new impetus given to our staple manufactures, of which they are as yet largely susceptible, will, by opening new markets, and extending those already open, diminish the disproportion now existing between capital and labour, and the field of employment—improve the condition of the labouring classes—increase the profits of the trading and manufacturing classes, and thus, by adding to the pecuniary means of all, augment the demand, both at home and abroad, for articles produced by a more skilful and better paid order of labour.

Whether anything can be done to secure to the workmen an interest, which shall run parallel with that of capitalists, in the profits of improved machinery, admits of doubt. If the reasoning in a preceding chapter is sound, as I believe it to be, the profits of improved machinery *are* necessarily divided between capitalists and workmen, though the proportion in which they are divided may vary in degree. Whether the division can be rendered more equal by legislative interference, as is sometimes proposed, is a very nice question for determination. Mr. Babbage has thrown out a suggestion for giving to the workmen a more immediate interest in improved machinery, by some plan which should enable them to share with the capitalists the profits *as profits*. But to this I cannot but think there will always be found insuperable objections. One objection will be, the manifest injustice of giving to workmen the profits of their employer, while they, at the same time, remain without liability for his losses. Wages would thus wholly change their character, and become an *ad valorem* tax upon profits; and a tax, moreover, from the circumstances just adverted to, of a partial and unjust description. The labourer would be converted into a partner, without the usual liabilities of a partnership, and the inducement to risk capital in trade and manufactures, which the operatives are, above any other class, interested in encouraging, would either be lessened, or wholly taken away. What would follow is obvious enough. The capital now invested in production would be withdrawn, and be transferred to countries in which it would be free from such a tax. It has been unanswerably shown, that for some years past there has been a growing tendency in British capital to quit the country, and invest itself in manufacturing undertakings elsewhere. How greatly that tendency would be increased by any such scheme as that suggested by Mr. Babbage, need scarcely be insisted upon, nor how injurious it would therefore be to the operatives themselves. Another objection to such a project is, that it is tantamount to the establishing of a duty on mechanical improvements, the impolicy of which has been already pointed out. To what has been previously said may be added, that British industry is mainly dependent for production upon machinery, without the aid of which there is not the means of subsistence, or of clothing for a single year, and that any pause, therefore, in the invention of mechanism, which a tax upon it would induce, must, unless all the rest of the world agree to pause also, be equivalent to receding.

CHAP. XII.—DISTRESS NOT CAUSED BY MACHINERY.

I believe I have now examined all the arguments usually urged against machinery, as one of the principal causes of the distress of the labouring classes, and shown them to be without value. It is difficult to perceive any necessary connection between improved and cheapened processes of production, and falling profits and wages, and it is believed that no one has yet pointed out such a connection. That the improvements made in machinery have, in some cases, rendered the labours of the operatives more severe than before, may be maintained with a better show of reason. The steam-engine is a severe task-master. The machinery to be superintended demands incessant and ever-vigilant attention, and as it is rendered more complicated or extensive, the demand upon the attention is increased. But the evil, as already remarked, lies not so much in that, as in the length of the hours through which the labour is continued, and the gradual diminution taking place in the sum of the labourers' earnings—not by the improved machinery, as we have seen, but by some other cause or causes.

There has been no intention, in what has been said upon this topic, to soften down, in the smallest degree, the actually deplorable condition of large masses of the operative portion of the population. The point aimed at has been to show that, however bad that condition now is, everything tends to prove that it would have been much worse had machinery been less extensively introduced into manufactures, seeing that the effect of machinery has been, on the one hand, so greatly to cheapen production and increase consumption, as to give employment to many more labourers than could otherwise have been profitably and remuneratively employed; and, on the other hand, to give to many—perhaps to most—of the operatives, by cheapening the cost of commodities, many comforts of which they would otherwise have been destitute.

What has made the condition of the English operative and labourer superior to that of the same classes in any other country on earth, except in the United States? The productive power of our industry, which power has been chiefly gained by machinery. Not all the industry of all the people in the world, unaided by mechanical power, could produce as much as England alone produces by her combination of human and mechanical power. Imagine that mechanical power to be annihilated. what would be the consequence? There would, no doubt, be labour enough in demand to absorb all the labourers to be found; but no doubt, also, there would be incomparably less to distribute amongst them than now, without any probability of the diminished quantity being more equally distributed than the larger quantity is now.

Turn the question about as we may, it is not a question of work, but of food. The distress resolves itself into this, that the quantity of food is too small to satisfy the wants of all, and the weakest, of course, "go to the wall." By far the largest portion of what there is, is obtained in exchange for the products of machinery; if the exchange could be enlarged, the quantity of food obtained would be greater, and everybody would be the better off for it. It is not a limitation of machinery that is called for, but freedom to exchange the products of machinery and human labour combined, which cannot be eaten and drunk, for those commodities of other lands which *can* be eaten and drunk, and of which the unemployed and badly-paid operatives and labourers get too small a portion. Ere long, the classes who suffer most will see the question in this light; in the meantime, those who do so must be content to instruct them, and bear the odium, it may be, of striving to mislead and injure them.

What is it that Great Britain or any other country stands in need of, to ensure the prosperity of her people? Abundance upon easy terms. What are the sources of abundance? Rich soils, favourable climates, skill in cultivation, and facility of conveyance in respect of the products of the land, whether they be for the food of man, or of animals for the service of man, or the materials of manufacture. And, in respect of other commodities, the sources of abundance are, raw materials derived from the most productive places, skill in converting those materials into the articles wanted, machinery for saving human labour in the process, and strength for setting that machinery in motion, drawn by science from some power of nature which never wearies. These are the sources from which abundance is to be obtained by the least possible exertion of human labour (See Letters by the late Deacon Hume, Esq., p. 9). Is there any one known country possessing all these means of abundance within itself? Not one. One country possesses some of them, another country others of them—that is, more or less in perfection; and, in proportion as the several countries, thus diversely supplied with the means of abundance, are separated or isolated from each other, is the field of production limited to them, severally. There is scarcely a civilized spot on the globe in which the now impoverished labourer cannot produce, in excess of his own wants, some commodity by means of which he could provide himself with those other commodities which he cannot himself produce, but of which he stands in need. This he would do, if his powers of exchange were not arbitrarily restrained. The diversities of climate, soil, and other natural means of production, which characterise the several countries of the world, plainly enough indicate the beneficent designs of Providence. The great human family has one common field for the exercise of its industrial powers opened up before it; and it is by each several branch of that family applying its skill and industry in the most productive manner, according to the facilities which its particular locality affords, and then generally interchanging the products of that skill and industry, that the bounties of Providence are to be turned to the best account, and the comforts and enjoyments of mankind at large are to be the most fully secured. "The commerce between an agricultural and a trading nation," says a writer on this subject, "is as mutually advantageous as the commerce in corn and cloth carried on between the inhabitants of a town and the farmers in the neighbourhood. If a free trade in cloth and corn were allowed between England and France, the art of agriculture would improve in France, and the art of making cloth would improve in England; but the art of making cloth would remain nearly stationary in France, and in England the art of agriculture would make slow progress. The mutual benefit which the two countries would derive from such free trade is indisputable, on the supposition that such free trade is not subject to interruptions, for every Englishman and Frenchman would then procure the necessaries of life with diminished labour, and, consequently, the wealth or power of both England and France would be increased." Anything that prevents this commerce narrows at once the field of production and the sources of enjoyment. Any natural impediment that stands in the way, such as may be created by distance, or by difficulty of communication for example, is that which the skill of man will address itself to remove; and, sooner or later, it will be, if not altogether removed, so far reduced in its magnitude, as to be comparatively insignificant. The powerful agency of steam has already accomplished marvels in this respect. A voyage to the United States, or even to India, is no longer a formidable undertaking, and the length of the time it occupies, and the dangers it presents, offer no impediment to the most active and extensive commerce with those countries. Nations less remote than these, are, of course, even still more within the sphere of active commercial intercourse.

But it is a remarkable fact, that, in proportion as the natural impediments to a general intercourse amongst distant nations had been removed, by the discoveries and applications of science and mechanical skill, artificial and arbitrary impediments to their commercial intercourse had been devised and set up. Instead of turning their own resources to the best account, and obtaining the largest sum of enjoyment, by exchanging a portion of what each could produce with a comparatively small expenditure of labour, for a portion of what some other country could in like manner produce by a comparatively small expenditure of labour—one excelling in one department of production, and another in another department—they have, each of them, shut themselves up, in a greater or a lesser degree, within their own narrow circles, and, by loading with duties the imported productions of other countries, which their own population has stood in need of, they have diverted capital and industry from their natural channels, and compelled a large proportion of their own people to employ themselves in the production of inferior commodities at a greatly enhanced price, compared with what might have been obtained in the natural and obvious course of foreign exchange. And Great Britain has unhappily taken the lead in this unnatural and suicidal policy.

At the termination of the war, those countries in which agriculture is the natural and most profitable occupation of the population, were open for our manufactured produce; and had no artificial barrier been raised up between them and us, nearly the whole country of Europe, with North and South America to boot, would have been, and continued to be, to Great Britain, one extensive field of productive industry; they supplying food and raw material, we converting the raw material into manufactured commodities. This was prevented by the enactment of corn-laws, which, though modified in 1828, and again in 1842, have all along operated, and still do operate, to limit our markets; first, by compelling the countries in which agriculture forms the most profitable field of production, to take only the *minimum* quantity of manufactured goods; and next, by forcing them into manufacturing processes for themselves. "England," it has been well remarked, "is no longer dependent on agriculture and the home trade alone. The home market is not sufficiently extensive to give full activity to the productive powers and industry of the country, and the markets of the world are necessary to ensure our prosperity. Even if a portion of the population engaged in manufactures could, by any possibility, be annihilated and cut down to a proportion which would be fully employed in satisfying the domestic demand, the energies of that diminished portion would soon need a wider field for their unfettered exercise, and would require the removal of the artificial barriers which limited their powers and diminished their prosperity. But it is, of course, foolish to entertain the idea of cramping the industry of the country, with the view of rendering it more prosperous. There the non-agricultural population is; and to its skill, aided by the wondrous power of machinery, are we indebted for the luxuries which nature has bestowed upon other countries, but denied to this, giving it, instead, unlimited mineral wealth, a fortunate geographical position, and a population whose admirable qualities have never been surpassed" (Knight's Store of Knowledge, p. 93).

What an extraordinary and startling condition is ours! With almost unlimited powers of production we have an idle and a starving population. Foreign countries are inviting us into their markets, and offering us, in exchange for manufactures, which we can produce almost without limit, the very thing which, of all others, we want. Capital is being sunk in unprofitable speculations, or is transferred to foreign countries, while our own machinery is lying idle and our fields put partially cultivated. Our operatives and labourers are in want of employment, while the population is but half clothed and half fed. We have augmented facilities for production, with falling profits, reduced wages, and increased anxiety for all engaged in productive industry. The country abounds in wealth, yet we see *minimum* wages paid out of a *minimun* profit in consequence of the competition which brings the market-price of an article to its lowest scale, or nearest approximation to the price of the raw material of which it is made. With the increase of productive power, we are decreasing the power of consumption by pauperising the mass of the people. As wealth has been heaped up on the one hand, penury and destitution have been increased on the other, until a fifth of the population has been steeped in pauperism, and gaols and workhouses disfigure the face of the country. The field of production being narrowed, the power of consumption is proportionately limited; so that, by a natural reaction, the power of production itself is growing unhealthy and useless. The means of averting the crisis with which we are now threatened is clearly within our reach. We want but room for our industry to exert itself in; and that we may have, only by removing the artificial limits which the law has set up.

ON THE SEVERAL MODES OF RAISING PRODUCE FROM LAND, BOTH GRAZING AND ARABLE.

In our last number we stated that the disproportion in the price of butcher's meat, dairy produce, and the other productions of agriculture, was greater than it ought to be, under a judicious system of management. We refer particularly to the state of our markets, lately in Canada, that meat, cheese, and butter were unusually high in price, and other productions of land at a low price. No doubt a given portion of land will produce much more nutriment, in the shape of bread and vegetables, than it would in butchers' meat, but certainly it is unprofitable farming, when hay and inferior grain is at a very low price, and meat, cheese, and butter at a very high price, because one could be readily manufactured into the other. We shall endeavour to submit what we conceive to be the production of land in several ways that it may be employed. Our views may not be perfectly correct, but from our own experience we believe they approximate to it as nearly as necessary for enabling a farmer to apply his lands and produce to the most profitable uses for himself and for the community. In estimating the comparative production of land employed in raising and feeding neat cattle and sheep, and in arable culture, producing crops, supposing the land in both cases good, and of equal quality, we shall first calculate the cost of raising a heifer or steer, intended for beef, to the age of three years. For the first year one acre of land would be required to give the calf milk, grass or hay, up to the time of becoming one year old. This would be the lowest estimate possible, but we believe it would be sufficient, because a cow might give milk for two calves for three months, and they need not give milk longer, and she might pay for her keep by her milk for the remainder of the year. We think, therefore, that one acre of land should provide all that was necessary for a calf the first year. The second year, it would require one acre and a half to give it grass and hay. The third year, two acres would be necessary, and to fatten the animal the last half year, from May to November, one acre and a half would be required. This would make six acres for the three years and a half, or up to the period that the animal would be fat on grass and ready for the butcher, or fit to be put up to be stall-fed for the winter. We shall compute the value of the animal fattened on grass when three years and a half old, in the ordinary way, without any extra food but what the land we have assigned for its use might produce, allowing manure to pay for attendance. An animal raised in this way we could not estimate to weigh over eight hundred pounds, beef, hide, and tallow. If it should weigh more, the extra average would not be too much to allow for the risk of disease or death of animals. We shall not pretend to follow up our estimate further than to show that it requires six acres of land to produce an animal that, at three and a half years old, will give 800 lbs. of beef, hide, and tallow. Animals may be brought to a much greater weight, but the cost of doing so will be considerable. We have not included in this estimate any charge for the calf when born, but we shall allow this item to make up any overcharge we may have made, though perhaps were we to add half an acre more of land, making the cost of an animal at three years and a half old, six and a half acres, it will be found nearer the real expense. A heifer raised for the dairy would cost about the same as an ox, annually, up to the time of her first calf. This may be at two years old, but we should think it might be as well when three years old, and make very little difference in the profits, as the animal would be so much improved by remaining in the heifer state until three years old, that she would pay the additional expense of a year's keep. We would estimate the value of a heifer when having her first calf at two or three years old as fully equal to an ox or steer when half a year older, and from this circumstance raising neat cattle of the heifer kind would be more profitable than raising the male animals. We have thus submitted our opinion of the cost of raising neat cattle to a certain age: it now remains for us to show what the same quantity of land might produce, applied to the breeding of sheep. We do not in this estimate include the cost of any food, except hay and grass, which we conceive the land assigned to each species of stock would be able to give. There might be something extra for cows in spring. First year one acre of land might be sufficient to support two sheep at one year old, which would give two fleeces of wool, and perhaps two lambs. The second year these two sheep might be kept, and one of the lambs sold in the fall. They might give two fleeces of wool, and three lambs, selling one of the latter before the end of the second year. The third year there might be five sheep and five lambs, yielding three fleeces of wool.

Hence at the end of three years, four acres and a half of land would have maintained the above number of sheep, increasing the stock from two one year old ewes, to five full grown ewes, and five lambs, and also giving seven fleeces of wool and two lambs sold off. We do not estimate for casualties, but we think sheep are not subject to many, if properly kept. The value of this increase of stock and of wool, we think, would bring the profit of sheep to be equal, if not to exceed, that of neat cattle. In all this estimate we have not attempted to do more than show the quantity of land required to keep animals for a given period. We shall now endeavour to show what an equal quantity of land would produce under arable culture. We must take the produce of the land for three years in one case, and for four crops in another. For three years we shall estimate for one acre and a half of land of good quality. First year, ploughed up and sown with oats or peas, yielding 40 bushels of the first or 20 of the last. Second year, cleaned and manured, if after peas, for potatoes, and if after oats for beans—or perhaps from the uncertainty of potatoes, beans might be substituted in either case for the present. Twenty large cart loads or more of manure would be required for this crop, and two ploughings and two harrowings, besides the planting and after cultivation, which would be about equal for either crop. The seed for potatoes would, however, be about four times as expensive as the seed of beans, according to the present rate of each. The produce of potatoes we could not estimate now at more than 150 bushels to the acre while subject to disease in the seed and crop—beans at about 20 to 30 bushels to the acre, and we think the latter might easily be obtained, as Canada is most favourable for them. The comparative value of these crops to the farmer, we believe, would be found nearly the same, as the expenses of potatoes are much more than of beans, in seed, in harvesting, and in selling. The third year, the land to be in wheat, estimated at 24 bushels to the acre—in this case we shall estimate at the rate of six acres and four crops, as would be necessary should the animal be fattened and kept to the fall of the fourth year; the land would produce a crop of hay as the fourth crop, suppose 200 bundles to the acre. The following will be the result of the produce of the land in each case :—6½ acres of land will produce a fat ox 3½ years old, estimated to weigh 800 lbs. beef, hide, and tallow. 5 acres would produce a cow 3 years old fit for the dairy, and estimated to be of equal value as the fat ox. 1½ acre of land kept in crop, allowing half an acre for waste to make up 5 acres in the 3 years, would produce the first year in oats or peas (estimated at equal value) 40 bushels of the first or 20 bushels of the last to the acre; that would be 60 bushels of oats or 30 of peas. Second year, the same land in potatoes or beans (considered of equal actual value to the farmer), in potatoes at 150 bushels to the acre, 225 bushels, or in beans at 30 bushels to the acre, 45. Third year, in wheat at 24 bushels to the acre, 36. Fourth year, to make up 6½ acres, 200 bundles of hay to the acre would make 300 bundles. The gain on sheep kept on five acres as above at the end of 3 years would be three sheep, seven lambs, and seven fleeces of wool. The cost of tillage, manure, seed, harvesting, thrashing, &c., over the return of straw, we could not estimate at less than from thirty to forty dollars, not including the extra expense of potatoes, as we only value a crop of potatoes to be equal to that of a crop of beans to the farmer, after they are disposed of, and all expenses paid. This estimate may assist to show the comparative produce of land applied to raise animals, and grain, and green crops. It might be desirable to continue the estimate with regard to dairy produce, but this produce varies so much in value according to the situation where it is made, that it would be impossible to be very accurate. Where butter only is made, the profit cannot be so great as where cheese also is made. In any situation, a suitable cow for the dairy for which we would appropriate from 3 to 4 acres of good land to provide her with grass and hay for the year, should yield a return; when butter only is made and the calf fattened as veal, of from twenty to twenty-five dollars, and if cheese is made, thirty dollars. Of course, this would depend upon judicious management of the cows and the dairy, and would have to be charged with the expenses of the dairy, but the manure might pay for other attention to the cattle. We should be glad that our dairy farming would be increased, as it would be furnishing a produce that would be constantly required for home consumption and for export. We trust our subscribers will make allowance for any inaccuracies they may discover in this article. It may induce others to take the subject into consideration, and correct all the errors in our estimate. There is no doubt that butchers' meat and dairy produce is much more expensive in its production than flour of wheat or any food that is raised by arable culture. What the proportionate cost may be, this article may assist in ascertaining. We are convinced at all events that our estimate of the expenses of raising animals is not too high. We thought it best not to set any value on the several products, with the exception of that of the dairy, the value is so changeable.—Canadian Agricultural Journal.

GUILDFORD FARMERS' CLUB.

The monthly meeting of the Farmers' Club was held on Tuesday, October 27, when, among the members present, were—J. M. Molyneux, Esq. (who took the chair), R. D. Mangles, Esq., M.P., Colonel Sumner, Captain Wight, H. Currie, Esq., A. L. Coussmaker, Esq., Crawford Davison, Esq., and Messrs. Evershed, W. Messenger, J. Ellis, — Shotter, &c., &c., &c.

After the minutes of the last meeting were read, Mr. MESSENGER rose to introduce the subject, which was, "On the general management and best mode of fattening sheep." After stating that he should not have had the presumption to address them on the subject had it not been for the remark of their president, on a former occasion—"that somebody must begin." He said—In introducing the subject, I shall confine myself to wether sheep, as we are not, to any extent, breeders. There is one great object to be kept in view, not only as regards sheep, but also every other animal intended to be fattened; they should always be kept in a thriving state; and, to do this, strict watchfulness is required; to ensure which, of course care must be taken not to over-stock—and on this head every person is best able to judge for himself. The old calculation, and one which was considered full stock, was, one sheep to every acre of land on a farm, taking one part with another. I am inclined to think this is something like the quantity allowed on the chalk farms, like some of those in this immediate neighbourhood; but now, in many instances, from the improved mode of root cultivation, we can easily find food for one sheep to an acre in summer, and five to two acres in the winter, when we have a good crop of turnips. There is, perhaps, no part of the farm which more requires the master's constant attention than his flock; and perhaps no part where he is more dependent on the diligence and observation of his man. A careful shepherd is very important; and few, very few men, are calculated for the office. Unless a man has a natural taste for the animal upon which he is to be in constant attendance, he will fail to be of that service to his employer he is in duty bound to be. The man best calculated for a shepherd is one who values neither his labour nor his rest, so that his flock be attended to. I have seen the same flock of sheep feeding on the same pasture under one man, be discontented all the day, and go to the fold at night as empty as when they left in the morning; while, under another shepherd—one more acquainted with the habits of sheep—they have fed almost the whole of the day, and go to fold as you would wish to see them. Here I cannot help making an observation on the practice of sending a boy (with a dog, over whom he has no control) to mind a flock of 200 or 300 sheep; the common result is, the sheep find out the most shady place, and there spend the day, reposing with the young shepherd. I am aware there is a difficulty in inducing sheep to feed in the extreme heat of a summer day; but in most instances it can be accomplished by selecting the most open and airy places. As an instance, on the Farnham original turnpike road, I have seen sheep feeding in the hottest day, when one would almost wonder what they could find to bite. As a means of ascertaining which are the most profitable lots of sheep to purchase, I would suggest the advantage of keeping distinct marks on the different purchases, and testing (by figures) in every possible way, the merits of the various sorts you may have in your possession. This may be done by keeping a debtor and creditor account of each, from the time of buying in to selling out. There will be some difficulty in keeping an exact account of every item; but it will answer the end intended if the different lots be charged in the same proportions, and then you would have a list of the most profitable sorts, to buy for the future. Any one, who has kept such an account, would not easily be induced to discontinue it. An exact account of the weight of wool has to be entered; and I have found it to be of no uncommon occurrence for this to vary from 1s. to 2s. in value per head, on sheep whose cost price was the same. I have always found that the lighter wool robs the appearance of animals in size more than the heavier. As it regards dipping the sheep to guard against the tick and fly, I am convinced it is most essential, and is omitted at considerable sacrifice, both as to the welfare of the animal and the quantity of wool. I consider that the loss to the sheep is about 1lb. of wool each, which, being about 1s. in value, would pay for the dipping of six sheep. There are two other things to be attended to in the management of sheep; that is, extreme quietness—required by the natural timidity of the animal—and as great regularity in feeding as can possibly be attained. I believe that the quantity of sheep kept on a farm is an indication of the way in which the business of it is conducted; for no man can farm badly, and keep a large quantity of sheep to any advantage; and it behoves every farmer to keep as many as he can, both for the manure and the fact that mutton is now 5s. per stone. As it regards the fattening of sheep, I am not prepared to offer you any scientific remarks of my own, as to how many pounds of turnips, beans, peas, or barley, each animal must consume to produce a certain quantity of flesh, which, if exactly ascertained, would tend to the advantage of the farmer; but the result of experiments would not be the same in all instances, for, as you are aware, there are sometimes certain remarkable animals in a flock, that will beat the others on the same feeding. Doubtless the same would be seen under a purely scientific system of fattening. The greatest point is the selection by practical experience of the best sort of animals, with the greatest tendency to fatten, at the smallest expense, or, in other words, to produce the greatest quantity of mutton for the food consumed. There can be no doubt that the cheapest mode of fattening sheep is by turnips alone. Of course I cut my turnips, considering cut turnips for young sheep quite equal to whole turnips and corn. From the good root crops of last year, I should suppose there never were more good sheep made from roots alone—the extreme mild winter had of course something to do with it. It was no uncommon thing last spring to find two-toothed sheep weighing 12 stone from turnips alone; and in the spring of '44 I saw twenty two-toothed sheep averaging 13 stone each, that had only eaten corn and roots. The immense difference there exists in cutting for sheep, and allowing them to cut and grind for themselves, is now well known and acted upon. Where it is not, a great sacrifice is made in more ways than one, for cutting makes a great deal of profitable labour in winter, of which we are often in want. The system of pulling and burying Swedes for spring feeding I consider decidedly advantageous, and ought to be more generally adopted. By drawing the crop from the ground, you keep it from impoverishing the soil, and the sheep do much better on them, after they have been trimmed some weeks. The Swedes should be trimmed when they have attained their full growth, this in a mild winter, will be when the greens begin to start. The cost of trimming is 6s. per acre, and they should all be pulled; for if the spade goes into a root, that root will rot. Swedes should be covered to prevent the frost, and their becoming too dry. A man or stout lad of about 16, should have a certain number of sheep allotted out to him, to look after entirely, trim the Swedes, &c., by which means the trimming is done better, and a week's consumption obtained in advance. A man and a boy will trim and cut for 200 sheep, if the roots are of a moderate size. The labour of trimming and cutting is about double to what it would be in feeding whole turnips. Sheep will eat more of turnips that have been trimmed, and do better on them. The experiments I am about to give were recorded in the 'Journal of the Royal Agricultural Society.' A lot of lambs were weighed on the 11th Oct., and part kept on white turnips, and part on Swedes, both being cut; on the 8th Nov. those fed on turnips had increased 10¾ lbs., those on Swedes 4¾ lbs., being 6 lbs. in favour of turnips; but as the cold and wet weather set in, the Swedes were found to get more nutritious, and the turnips less so. Another lot of lambs was weighed on 7th Oct., and also on the 3rd Nov.; part of them were fed on cabbage and Swedes, and part on cabbage and carrots. The former gained 10¾ lbs., and the latter 9½, being 1¼ lb. against the use of carrots. From the 12th Oct. to 28th Nov. part of another lot was fed on Swedes only, and the other part on Swedes and red carrots. The result was an increase of 3 lbs. in favour of the Swedes."

Mr. Davison.—If you use carrots for fattening you should use them alone; your animals will not do well on carrots mixed with other food.

Mr. Messenger.—So it is understood. Another experiment was with white Belgian carrots against Swedes. Six lambs fed on Swedes and chaff against white carrots. Swedes and chaff shewed 4lbs. increase in favour of the former. Eight lambs fed on cabbage and clover.—Chaff gained in a month 2¾ lbs. each more than the same number fed on Swedes and chaff. I think that cabbage is decidedly good for fattening. Two lots of sheep were tended by the same man, and fed as nearly as possible on the same food. In nine weeks and three days those in the yard gained 19½ lbs., and those in the field 20½ lbs.

Mr. Currie had always understood the general opinion to be in favour of yard feeding.

Mr. Messenger.—So it is considered. The difference was not great you will observe. In another experiment 8 lambs fed 12 weeks on the field were weighed against 8 fed in the yard. The former had gained 32 lbs., and the latter 28 lbs.

Mr. Currie thought that the sheep might, from their nature, require more air than could be found in the yard.

Mr. Messenger.—I must admit the result of these experiments is different from what I should have anticipated. I have always been inclined to think favourably of yard feeding. Unquestionably our yards generally are not adapted for feeding; they are too wet. The fermenting of the manure is injurious to the animal. If the system be preferable, I think something of this sort may be adopted. To have, say 50 or 100 that you are wishing to get ready for the market, and as you sell them supply their places with others. The extra expense of carting the food to the yards will operate against its being done to any extent. You will find it not a slight job to cart off 10 acres of Swedes a quarter or half a mile.

Mr. MANGLES described the mode adopted by a gentleman, whose name we understood to be Huckstable, to prevent the fermentation of manure injuring the animals feeding in the yard. They were kept on battens, and the wet drained underneath.

Mr. MESSENGER resumed : The only experiment I can give you of my own is as follows :—Fourteen tegs selected the 26th of May, 1845, were fed in-doors on roots, grass, cabbage, &c. Three of the sheep were valued at 40s., and eleven at 30s. They consumed 12 sacks of peas at £1 per sack, 9½ cwts. of oilcake at £10 per ton, which, added to the price the sheep were valued at, amounted to £38 5s. Four of the smallest were sold on the 25th of September at 52s. The remaining ten were kept till the 18th of December, and sold by weight at 5s. 2d. per stone, making the total for all £45 5s. 6d., being a balance in favour of the sheep of £7. I think the manure in this case would be a set-off against the labour. I can give an instance from my own experience of the weight high-bred southdown sheep can be fatted to. On the 3rd of May three four-toothed sheep were selected, which had never eaten corn or hay till the 11th of April preceding. They were kept in-doors and fed on beans, peas, oil cake, roots, hay, &c., from that time till Christmas, when the total weight was 60 stone. Of these three the smallest boned and highest bred sheep was the heaviest. The man who fed them called it the little sheep; it weighed 21 stone." Mr. Messenger concluded with some remarks on the best sort of sheep. He was, upon the whole, in favour of high-bred southdowns, as possessing the greatest symmetry, the heaviest and best wool, and the greatest tendency to fatten. The west country sheep, he admitted, had an advantage in the first year, from their being bred early; but the difference was much less in the second year. High-bred sheep were objected to on account of their small size. The fact was their heads and bones were not large; but these were points in their favour. He would allude to the supply at Guildford fair last May, to prove that coarse, large-headed tegs were going into disrepute. He did not consider the Merino sheep had received the attention they ought. On some farms they might be kept with advantage. Whatever was lost in size was gained in wool. The Merino mutton was, he believed, as saleable as any other in Smithfield. In consequence of the Merino sheep being regarded more for the wool than the meat, the animal had become subject to every possible deformity, but this might be easily counteracted.

Mr. CURRIE, in allusion to the remarks of Mr. Messenger respecting the shepherd's dog, always thought that it was an exceedingly sensible and useful animal, and one of great service to the shepherd.

Mr. MESSENGER said his remarks applied more particularly to sheep that were fattening, and not to breeding flocks, though even as it regards the latter, he did not think a dog of much use, unless a very good bred one, and that was the exception and not the rule.

Captain WIGHT said a dog very often made the shepherd lazy or inattentive. Not long ago his shepherd left the dog in the charge of the flock, while he went to Guildford.

Mr. MANGLES thought dogs might be very useful in Scotland, with extensive flocks and large tracts of country.

Mr. J. ELLIS agreed with Mr. Messenger respecting the shepherd's dog. The only use it appeared to be was to keep the sheep away from the pitch of food in the morning. This was obviated by the shepherd rising so early as to be up before the sheep. The dog was apt to disturb the sheep, and to prevent that quietude which was of so great importance in the fattening of so timid an animal. Mr. Ellis then showed upon physiological principles, why cutting the turnips was better than allowing the sheep to feed on them whole. He thought that the experiments quoted did not establish that field feeding was better than yard feeding, if properly conducted. The experiments made by Earl Ducie tended to establish the contrary. He fed his sheep in sheds, some covered and some not. Mr. Ellis then showed that keeping up some degree of warmth in the animal materially promoted the process of fattening. With regard to the sheep being more in their natural state when feeding in the field, the fact was, fattening them as they did, they were going beyond nature and therefore were obliged to have recourse to artificial means to produce the desired end.

Col. SUMNER, in corroboration, noticed the plan of the Duke of Richmond, and its successful results.

Mr. MOLYNEUX suggested the advantages of adopting some such system of covering farm yards as was adopted at the railway stations.

Col. SUMNER alluded to the custom of Mr. David Barclay, who always housed his ewes in lambing time. He thought the plan not a good one, as the change must be very great when the lambs were put out in the air.

Mr. MANGLES, corroborating the remarks of Mr. Ellis as to feeding animals beyond nature, quoted the remarks of Nimrod as it regarded the training of hunters.

Some conversation arose as to the age of the sheep at which they were better suited for fattening, in which Mr. Evershed, Mr. Ellis, Capt. Wight, and Mr. Davison took part. The impression was, that while the question must depend greatly upon circumstances, young sheep, as a general rule, were better than those more advanced; four-toothed sheep were held to be better than six-toothed. After some further conversation on Merino sheep, the result of which was, upon the whole, a coincidence in Mr. Messenger's views, the discussion was declared at an end.

PETERBOROURGH FARMERS' CLUB.

The monthly meeting of the club was held on Wednesday, the 11th November, Mr. J. Whitwell in the chair. The subject for discussion was "The best method of stall-feeding beasts," and the following resolution was adopted:—"That in winter-feeding cattle it is recommended the animals should be fed separately, or in shed-sheltered yards, containing not more than two beasts in each; that the food given per day be a quantity not exceeding one bushel of turnips or other vegetable, in addition to which 6lb. or 7lb. of linseed-cake, or half that weight of linseed boiled in a sufficient quantity of water, with about half a peck of bean or barley meal."

A letter having been read from Mr. Shaw, the Editor of the *Mark Lane Express*, on "Tenant Right," it was agreed that it should be the next subject for discussion; and Mr. J. Webster having been requested to bring it forward, that gentleman consented, observing at the same time that he felt seriously the responsibility he incurred by introducing a question on which so much depended the future prosperity of agriculture, and by which a tenant might be permitted to improve the property of his landlord, and employ the poor as well as provide food for the continually increasing population, and meet foreign competition.

It was agreed that the future meetings of the club should take place at 5 o'clock p.m., on the first Saturday in every month; so that Mr. Webster will bring forward the subject of "Tenants' Right," on Saturday, the 5th December inst.

The following new members were elected:—Mr. Carter, of Ailsworth; Mr. Wright Laxton, of Morborne; Mr. S. Watson and Mr. Buck of Thorney; and Mr. S. Taverner, of Peterborough.

The club now consists of 78 members.

TENANT-RIGHT.

TO THE EDITOR OF THE MARK-LANE EXPRESS.

Sir,—The subject of tenants' right has not yet commanded the attention which so important a question deserves; nevertheless, let us still hope that time will bring about so great a change in the dispositions of the farmers that they will faithfully represent their interests, and fearlessly defend their rights.

The sensible remarks of your Bolton correspondent very fairly exposes the present system of letting land without sufficient security to the tenant-farmer for the investment of capital. The clap-trap recommendation of letting farms upon leases, without additional and sufficient security for the investment of the tenant's capital, will not be generally adopted, because in the absence of this security the tenants will not lay out their capital beyond their reach at the expiration of their terms; the knowledge of which is a serious objection on the part of the landlord to granting any lease at all: thus the soil is prevented yielding increase by improved means, and the community deprived of an additional supply of the necessaries of life.

Those who advocate "tenants' right" speak of common fairness only, and rely upon the good sense of the people for support; having no vain ambition to feed with popularity, nor desire of disturbing the good feeling between landlord and tenant, their chief object is to remove the present barrier to improvement, and to afford greater facilities in supplying food for the people.

If any advantage arises from a lease, it is generally neutralized by the covenants which are introduced. I cannot dispute the right (in law) which the landlord exercises over his property; but then, as all are accountable for the improvement of the talents entrusted to their care, so are all proprietors of land equally subject to this rule: nor are they justified in restraining the exertions of others when directed to improvements for the benefit of mankind. I see no difficulty in making equitable arrangements between landlord and tenant, if reciprocity is the acting principle: on either part security of property is desirable. Then, as the proprietor is secured in his rent by act of Parliament, so should the tenant have the same advantage for his capital invested in improvements upon his farm, in these few words (backed by act of Parliament)—"All unexhausted improvements, of whatsoever description, made upon the farm during the occupation of the present tenant, his administrators or assigns, which shall be fairly assessed by competent persons, at the expiration of a term, or upon the tenant quitting the same, shall be paid for by the proprietor of such farm."

I trust that you will forgive my troubling you with these few hurried thoughts.

Your humble servant,

Thomas Ellman.

METEOROLOGICAL DIARY.

Barometer.			Thermometer.			Wind and State.		Atmosphere.		
Day.	8 a.m.	10p.m.	Min.	Max.	10p.m.	Direction.	Force.	8 a. m.	2 p. m.	10 p. m.
	in. cts.	in. cts.								
Oct. 21	29.10	29.00	31	58	46	W. W. by N.	fierce	cloudy	cloudy	cloudy
22	29.10	29.39	45	51	46	W. by North	very bk.	cloudy	cloudy	fine
23	29.65	29.30	44	51	46	W. by North	lively	fine	sun	fine
24	24.55	29.54	44	50	44	S. East	gentle	cloudy	cloudy	cloudy
25	29.70	29.88	43	50	44	North	lively	fine	sun	fine
26	29.98	30.13	42	50	44	N. by West	gentle	haze	cloudy	cloudy
27	30.22	30.24	43	52	43	N. by West	calm	haze	cloudy	cloudy
28	30.23	30.10	34	46	41	N. East	calm	fog	fog	fog
29	30.07	30.08	41	49	47	N. East	lively	cloudy	cloudy	cloudy
30	30.10	30.14	44	52	40	N. East	gentle	cloudy	cloudy	haze
31	30.14	30.13	37	47	42	N.E., S.E.	gentle	haze	fog	fog
Nov. 1	30.08	30.00	37	45	45	S.E., S.W.	gentle	fog	sun	cloudy
2	30.00	29.95	40	57	48	S. West	gentle	fog	sun	fine
3	29.90	30.06	46	56	50	S. by West	gentle	cloudy	cloudy	fine
4	30.09	30.10	46	60	50	S. by West	gentle	haze	sun	fine
5	30.16	30.16	49	57	48	Easterly	calm	haze	haze	fine
6	30.16	30.37	41	48	42	E. by South	keen	haze	cloudy	cloudy
7	30.20	30.30	39	46	42	E. by North	calm	haze	haze	cloudy
8	30.34	30.39	40	46	42	E. by North	brisk	haze	haze	cloudy
9	30.40	30.44	39	44	41	E. by North	brisk	cloudy	cloudy	cloudy
10	30.14	30.37	40	47	44	E. by North	brisk	fine	sun	fine
11	30.31	30.30	41	52	42	E. by North	brisk	fine	sun	fine
12	30.33	30.35	43	50	45	E. by North	brisk	cloudy	cloudy	cloudy
13	30.37	30.33	43	48	45	E. by North	brisk	cloudy	cloudy	cloudy
14	30.27	30.24	44	48	45	E. by North	brisk	cloudy	cloudy	cloudy
15	30.20	30.16	40	46	42	East	brisk	cloudy	cloudy	cloudy
16	30.16	30.07	39	45	40	S. West	brisk	cloudy	cloudy	cloudy
17	29.94	29.88	40	52	50	Southerly	calm	cloudy	cloudy	cloudy
18	29.88	29.80	48	56	50	S. West	brisk	cloudy	cloudy	cloudy
19	29.78	29.80	45	55	49	S. West	brisk	fine	sun	cloudy
20	29.33	29.41	46	55	47	S. West	strong	cloudy	cloudy	fine

ESTIMATED AVERAGES FOR NOVEMBER.

Barometer.		Thermometer.		
High.	Low.	High.	Low.	Mean.
30.27	29.08	62	23	42.9

REAL AVERAGE TEMPERATURE OF THE PERIOD.

Lowest.	Highest.	Mean.
41.9	50.6	46.25

WEATHER AND PHENOMENA.

Oct. 21st, excessive rain. 22nd, small rain. 23rd, fine sunny day, rain in the night. 24th, changeable. 25th, gradual improvement. 26th, after haze a finer sky, of a pearly appearance; the first day of that high state of barometer noted above. 27th to the end of the month, haze and fog; very unusual at this season.

LUNATIONS.—Last quarter, 27th, 3h. 10m. afternoon. November 1st, wind above and below—cross, fine sun. 2nd, after fog, very fine. 3rd, some rain early. 4th, very warm; clear sun after fog. 5th, cheerful; evening oppressive. 6th, a cold, cheerless day. 7th, mistling rain; gloomy. 8th and 9th, dark; end of the hazy weather. 10th, clearing, with beautiful sun. 11th, perfectly beautiful; warm; rich tints at sunset, crimson glow round the horizon. 12th, clouds and gloom. 13th and 14th, the same. 15th, wind wavering; the same brisk current uninterrupted till this day. 16th, change of wind, and termination of that great and continuous height of the barometer as indicated above, and which is seen to be frequently attended by settled gloom, with merely occasional sunny intervals. 17th to 20th, inclusive, mossy clouds, frequent showers, and lively gales of wind.

LUNATIONS.—Full moon, Nov. 3rd, 9h. 11m. forenoon. Last quarter, 10th, 11h. 44m. afternoon. New moon, 18th, 11h. at night.

REMARKS REFERRING TO AGRICULTURE.

After the swamping rains of October, succeeded by fogs, the brisk drying winds brought the ground into healthy temperament, and enabled the farmer to sow wheat with every promise. Much of it is up; and though late, so warm was the bed that the seed germinates rapidly. Potatoes are a poor crop, but far less damaged than feared. Not a hint of frost; but the strong winds have suddenly cleared the trees of leaves. J. Towers.

Maidenhead Thicket.

CALENDAR OF HORTICULTURE.—DECEMBER.

We are now decidedly in the winter quarter—the season of *torpor and repose* is fairly established; the leaves of most trees are fallen, and growth has ceased. Then why persist in styling *that autumn* which is, in fact, the very *dead of winter?* Let us cede to astronomers the science of the calendar, and, for the sake of sideral calculation, be ready to allow that the entrance of the sun into Capricornus is the symbol of the rise or spring of the solar year, and so on: but where is the gardener or physiologist who would rationally contend that winter *must commence* about six weeks before the period when the sun has arrived at his lowest dip toward the horizon at noon, and terminate about six weeks after his entrance into the ascending signs?

On the 21st of November, the sun rises at half past seven in the morning; and evening twilight closes at six, or thereabout. But though the shortest day, or precise *mid-winter*, occurs on the 21st of December, yet *sun-rise* is later in the morning till the close, nor do the mornings lengthen till the 1st, 2nd, or 3rd of January. About mid-February we have more sunlight, by above an hour and a quarter, than we had November 21st, for the sun rises at twenty minutes past seven, a.m., and does not set till ten minutes past five, p.m. Nature is then active, unless the weather be unusually severe; crocuses, snowdrops, daffodils, violets, enliven the gardens, and numberless buds of trees and shrubs enlarge; yet we call this *winter*, although all nature is *springing* into life and expansion!

When error thus is rivetted by custom, we conceive that the philosophic lover of truth and nature is bound to protest against absurdities so palpable, the indulgence of which really tends to mislead the cultivator; and especially the one attached to the forcing departments, who ought, above all men, to pay the most scrupulous attention to the diminution and increase of solar light, as, of all the great natural agents, the most important during the season of winter.

In our damp climates moisture is apt to predominate, and this condition favours *mouldiness*, as the grower of *late* grapes—which he is anxious to preserve—now feels to his sorrow. Fire-heat and air, judiciously given, are essentials; but in all plant-houses, of what utility can it be to attempt to produce growth, when there is no solar ray to stimulate the torpid organism of the plant. Nature demands repose, and in almost every instance will obtain it, or become debilitated.

Operations in the Vegetable Garden.

These are chiefly protective and preparatory; for as to direct processes, they are dependent upon weather. If December prove austere, as in 1844, it were as well to labour at a rock: if wet, as in 1839, the land would be poached; and every experienced person must have remarked that ground worked in clods never bears a good crop, its very temperament is deranged: we shall finally allude to the probable weather. November, to the 17th, has afforded a season for preparation which has rarely been exceeded; the earth became free and mellow to the depth of three feet, if the subsoil was of a nature to admit of so effectual a trenching.

We would seize fine open weather to prepare asparagus, sea-kail, artichoke, and rhubarb plots—deeply—with new light turf, and abundance of manure, as before described. Let all vacant plots of stiff ground be deeply digged, and set up in ridges to mellow in the event of frost. In a damp state of ground it should be trodden on as little as possible, and even to weed by spud or hoe is worse than useless, upon clay or binding loam: the truth is, that weeds should not exist in December, after a season so auspicious as that of the month preceding it.

Take up all the roots for winter supply, unless it be some parsnips, which are improved by frost. Tie up endive, above the middle; and cover, here and there, one with a sea-kail, or other deep pot, to blanch it: some remove endive to heaps of dryish sand, under shelter of a shed, and they do the same by borecoles and Brussells-sprouts for daily use. If peas be above ground, and the weather and soil permit, draw some earth to them, and finally earth up celery. Artichokes are well protected by tree-leaves, interposed among the plants.

Destroy snails in their resorts—these are the bases and "set-offs" of walls, behind planks, tubs, and in dry drains; they collect in masses, and hundreds sometimes are found at once, as we proved a few days ago, behind some periwinkle, and iris plants, which had concealed the foot of a wall. Lime scattered among plants, and common salt over vacant, rough dug earth, will destroy multitudes of small slugs—the pest of the earliest sown parsnips, carrots, onions, and lettuce.

As to sowing peas, half the seed is lost, the rows are always meagre, and at best not ten days are gained. If there be a vinery or other warm erection, or frame, every pea raised therein in boxes or even on turfs, in January, will vegetate and repay trouble, while anxiety is obviated. Prepare ground, however, for peas, by enriching a plot with well-worked manure to the depth of 12 or 14 inches.

All plants in frames, and under glasses, should have plenty of air in fine open weather: cover at night when frosty, and protect the sides of frames and pits by linings of fern, dry straw, or leaves.

Fruit Department.

See November.—We should, however, always like to see the currant, gooseberry, and raspberry-beds (where these shrubs are grown in plots) with a clean surface, not digged, but simply turned by a flat cut with the spade, and then dressed over the position of the roots by some half-decayed, short manure. All wandering suckers of raspberries ought to be completely raised up by the fork. Neither transplant nor prune now, unless in extreme cases.

Forcing Departments.

Hot-beds and pits.—Deep beds of leaves are good for exciting asparagus: begin cucumbers, or keep up the heat of those already in progress; there is still a question, whether hot-water in tanks will answer equally with the old dung lining for them? However, we know a span-roofed house wherein cucumbers have been grown and fruited for several weeks past, in beds of light soil over a tank heated by a "saddle" boiler.

Excite salads, mint, &c., by gentle heat. Keep up 50° to 55° in the mushroom house. The pine-apple is the only plant which must have no check or torpor—therefore it must never lose a growing heat of 60° to 70°.

Prepare the early vinery; wash the rods with lime-water and sulphur; close the house. Bring up the heat by gentle increments and increasing moisture, so as to provide for the expansion of the buds by the turn of days. Then bring the temperature to 65°—60° by night; and this will be amply sufficient till the first week of January. No vinery ought, in justice to the constitution of the tree, to be excited before the 10th or 12th of December.

Flower Garden.

The leaves that are blown over the rather rough surface of the shrubbery, beds, and parterres are an unsightly but most useful protector: provided leaves be removed from lawns and walks, we should compromise for those on the garden-plots—no work can be done on these.

Keep cold frames, pits, and the green-house well aired, and the plants very cautiously watered. If severe dry frost occur, nothing can protect so completely as well-made straw mats: they never blow off, and do not admit frost; the walls, however, must be lined, and as green-houses cannot safely be covered except by a thin roller cloth, fires must be permitted to keep to 34° or 35°.

Forcing of roses is a fine and delicate art: there was a clever paper on this subject by the late R. A. Salisbury, Esq., commencing p. 122, vol. i., of Loudon's Gardeners' Magazine; the recollection of which was lately revived in Mr. Paxton's Magazine of Botany. Roses may thus be procured in abundance for many months.

Attend to bulbs in warm pits, to keep up succession.

Keep the flower-house and stove to 55°: press nothing into growth, but guard against the approach of frost. The gloxineas should be dry, and laid sideways, under some shelf, till the spring: all succulents should be dry.

The weather was dry till November 16; the wind then changed to W.S.W., and showers with wind now prevail. Every production appears healthy; borecoles, broccoli, savoys, and cabbages, seem very excellent. Kidney beans in the kitchen-garden are still green and fruitful; and in the flower-garden we have fuchsias, heliotropes, violets, geraniums, &c., in bloom, sure proofs of there having been no frost. And comparing the south-west change at the last equinox with the prevailing strong winds from that quarter, it would not be rash to conjecture that the winter, to its middle, is likely to continue mild, open, and windy.

November 20

Weald of Kent Farmers' Club.—At the monthly meeting of this club, held on the 28th ult., after some discussion, the following resolution was agreed to:—"Resolved—That in order to improve permanently the system of farming in the Wealds of Kent and Sussex, adapted to the present times, a thoroughly mutual understanding should exist between the landlord, the tenant, and the labourer; a more extended and improved system of drainage and cultivation should be adopted; and that it is highly important that no more land should be occupied than the occupier has sufficient knowledge and capital to cultivate well."

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR NOVEMBER.

Foremost in importance to the agricultural body, at this particular period of the year, is the state of the weather for out-door farm operations. That experienced during nearly, or quite, the whole of the month just brought to a conclusion, has proved unusually propitious to the sowing of the winter wheats; hence, as a matter of course, that work has progressed with considerable rapidity, and under the most favourable auspices. In many parts of England the plants have already appeared above ground; and it is highly gratifying for us to be enabled to observe that we never recollect to have seen them finer or in a more healthy state. These observations refer, be it understood, not to any particular locality, but to most of our large corn districts, over which we have travelled for the purpose of forming our conclusions respecting the many features of interest to our farmers. The value of the opinion frequently expressed, that a change in our import laws *must* have the effect of throwing out of cultivation a large portion of our wheat lands, from the inability of the home growers to compete with the foreigner, is now about to be tested. We ourselves have looked upon the late alterations in the corn laws as indicative of low prices here in years of great abundance; but, at the same time, we have endeavoured to enforce our honest conviction that it would be utterly impossible for farming to be carried on in this country, unless wheat—by far the most valuable crop we can produce—continue to form the *principal* article of growth with us. This point of our argument cannot be more fairly illustrated than by experience; and, from what we have recently witnessed, and from the remarks of our numerous correspondents, we maintain that the year 1847 will show a much larger breadth of land under wheat than has been the case during the last ten years. We would observe, this is no idle assumption, though it is a most conclusive proof of the energy of our agriculturists to keep pace with the rapidly increasing wants of the population. Many parties may feel disposed to argue that the increased cultivation we have here alluded to is purely the result of the prevailing comparatively high prices. To an extent, such is unquestionably the case; but feeling strongly impressed with our extensive and increasing wants as a nation, and the great necessity for supplying those wants, in order that at future periods we may be independent as far as possible of all contingencies the result of dependance upon the foreign cultivators, and, further, the importance of keeping the labouring population fully employed and well fed (all which matters are closely connected with native industry), we very much doubt whether, unless, indeed, our general policy, commercial as well as political, receive an unexpected and, by some, long dreaded convulsion, the prices of wheat will ever be lowered to that point at which it will be impossible to cultivate it. It would perhaps be unfair for us to draw inferences from the past season, which has been one of extreme interest, and in which we have had to report the failure not only of the potato crop, but likewise a considerable falling off in the produce of all kinds of spring corn; all which circumstances have increased the consumption of wheat far beyond that of the ordinary run of years. Still, in our judgment, it would be opposed to a practical view of matters to argue that the cultivation of wheat will be materially affected by the importation of a few hundred thousand quarters of foreign grain annually.

The next point to which we shall direct attention is the state of the stocks of wheat, both old and new, in the hands of the home growers. The stocks of last year's growth are very limited, and a few weeks will make a total clearance of them; but, notwithstanding the unusually large deliveries at the various markets, which have been made in excellent condition, those of the present season are good and of prime quality. Here, then, is a matter which cannot fail to have some influence upon future prices, and maintain a sensible effect upon consumption. This subject being one of the most vital interest to our readers, a few observations upon the statements which have found their way into many contemporary prints may be useful. On the subject of the relative value of wheat we have already expressed ourselves to the effect that though the imports of grain from America and elsewhere may be large during the coming year, the demand will not be more than adequately supplied; hence, present rates may be considered tolerably safe.

We have read with much attention the numerous highly-coloured statements respecting the capabilities of the United States to supply us with "breadstuffs;" yet we see nothing whatever in them to create any uneasiness—circumstanced as we are at the present moment—or that a great fall in our quotations will be produced thereby, for the simple reason that from no other quarter of the globe can we expect to derive large supplies of corn for a considerable period. High prices—at least much higher than those now ruling in our markets—we do not anticipate, because we feel justified in the assertion, that the evils resulting from the partial failure in the potato crop—partial we only consider it—and the comparative falling off in the supplies of barley, oats, beans, and peas, have been greatly alleviated by the large quantities of grain and flour which have passed the customs for home consumption, since the commencement of the present year. Again, it is placed beyond a doubt that the wheat produced this season is of a very superior description, consequently is yielding a much greater amount of really good flour than ordinary. These circumstances, therefore, induce us to conceive that we can entertain no idea of a famine, of famine prices, or of a great depression in our market.

In the early part of the month—at which time the millers and others were well in stock, and the supplies of most grain on offer considerably on the increase—comparatively little business was transacted in wheat or other articles, and the quotations suffered a pretty general decline; but towards the close the demand became steady, though the actual abatement previously submitted to was not recovered. Less activity has been observed in the demand for both fat and lean stock, and, in some instances, the currencies have had a downward tendency. This latter circumstance must, in a great measure, be attributed to the immense importations of foreign stock, which have taken place under the new tariff, in London and at the various outports, which, it will be perceived on reference to our "Review of the Cattle Trade," have greatly exceeded those of any month during the present year.

The fact that the potatoes have been on the increase in the metropolis and elsewhere, and that the condition of that esculent has much improved, is strongly corroborative of the views we have all along expressed, especially as prices have fallen from 10s. to 15s. per ton—viz., that the actual losses by the disease have been over-estimated, as far as England and Scotland are concerned.

It is very satisfactory to observe that the turnip and carrot crops are exceedingly good and of excellent quality. In all quarters the markets are liberally supplied with them, at very moderate prices.

Depastured stock has fared remarkably well, and the supply of food continues abundant. In some parts the disease has made its appearance amongst the beasts, yet the actual losses have not been extensive.

In Ireland and Scotland, the various markets have been moderately well, but not heavily, supplied with corn and cattle. A full average amount of business has been transacted in most articles, at full prices.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

The immense importations of live stock which have taken place for our markets during the past month have, as might have been reasonably expected, had a decided influence upon the demand for, and value of, both beasts and sheep produced in our various grazing districts. We are not about to assert that any material or alarming fall has taken place in the quotations; but there is one thing quite certain—that the value of home-fed stock has passed its highest point, and that, ere long, should the large arrivals continue from abroad, we shall have a great fall in them. The imports into London have been as under:—

From whence.	Beasts.	Sheep.	Calves.
Hambro'	209	38	—
Rotterdam....	1,410	4,761	84
Harlingen	529	2,678	20
Flushing	5	176	—
Nieu Dieppe ..	305	1,106	2
Bromvershaven	97	121	—
Maasleius	18	19	—
Leer	101	—	—
Tonningen ..	149	40	—
Antwerp	—	—	18
Total	2,823	8,939	124

Annexed is a statement of the receipts at the outports:—

	Beasts.	Sheep.	Calves.	Pigs.
Hull . . .	1,637	1,950	77	280
Newcastle . .	363	750	50	250
Ipswich . .	37	51	—	—
Yarmouth .	10	—	80	—
Plymouth . .	140	—	—	—
Southampton	19	—	—	—
Total . .	2,206	2,751	207	530

From the foregoing it will be perceived that the total imports have been not less than *seventeen thousand five hundred and eighty head!* At the same time last year they were only 2,162 head of all kinds. In the condition of the sheep imported since the date of our last report we may observe that it has considerably improved; in fact, by far more than double the weight of mutton has thus come to hand than in the former month. The beasts have not turned out quite so good; but when we consider the number which has reached us, the quantity of beef has been again very extensive.

A large number of both beasts and sheep recently imported has been purchased by our graziers for the purpose of being stall-fed; but we understand, in consequence of the many losses sustained, that very few parties will be found in future to embark their capital in such a speculation.

On the whole, the trade in Smithfield has been rather heavy, and the general quotations must be called about 2d. per 8lbs. lower than last advised. The comparison of figures with former years runs thus :—

Per 8lbs., to sink the offal.

	Nov., 1844.				Nov., 1845.				Nov., 1846.			
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
Beef ..	2	4 to	4	2	2	6 to	4	6	2	6 to	4	2
Mutton	2	6	4	2	3	6	5	2	3	8	5	4
Veal ..	3	0	4	0	4	0	5	0	3	8	4	8
Pork ..	3	0	4	0	3	6	5	4	3	6	4	10

Comparison of Supplies

	Nov., 1844.	Nov., 1845.	Nov., 1846.
	Head.	Head.	Head.
Beasts	12,560	17,433	20,361
Cows......	596	500	470
Sheep	123,200	120,390	114,460
Calves	1,040	1,060	1,186
Pigs	2,600	2,555	2,838

The above is a forcible illustration of the remarks we have so frequently offered, to the effect that, notwithstanding the complained-of shortness of stock in the country, the supplies for Smithfield would be gradually on the increase. The bullock droves have come to hand as follows :—

	Head.
Northern counties	8,500
Western and Midland do. .	3,400
Eastern districts	900
Other parts of England . .	2,950
Scotland	130
Ireland	300

The remainder of the supplies has been derived from abroad and the neighbourhood of the metropolis. Newgate and Leadenhall markets have been well supplied with foreign-slaughtered meat, as well as country-killed pork. The quantities of other kinds of meat on offer have not been extensive; yet the general demand has ruled heavy, and prices have not been supported. Beef has sold at from 2s. 6d. to 3s. 6d.; mutton, 3s. 4d. to 4s. 8d.; veal, 3s. 6d. to 4s. 8d.; and pork, 3s. 4d. to 4s. 10d. per 8lbs. by the carcass.

AGRICULTURAL INTELLIGENCE, FAIRS, &c.

ANDOVER FAIR.—There was a fair average quantity of sheep penned. Pens were let for between forty and fifty thousand. In the morning trade was brisk, at an advance per head of 1s. above the last Appleshaw fair, good Down ewes and lambs being quickly disposed of. Towards noon trade slackened, buyers not submitting, nor selling parties willing to give way; hence, towards the afternoon another reaction took place, and then all (or nearly so) were sold at such terms that we cannot quote a reduction. There were not many Somerset or Dorset horn sheep, the greater quantity consisting of Wiltshire and Hampshire Down ewes in lamb, lambs, fat 2, 4, and 6 tooth ewes and wethers, and some pairs of half-bred and Cotswold ditto.

ASHOVER FAIR was thinly attended with cattle and buyers, owing, no doubt, to Bakewell fair being held at the same time. Nearly all the cattle were sold, at high prices.

BARNSLEY FAIR was abundantly supplied with fat pigs, some of which were great weights and of superior breed; but the sales, owing to the very high price of feed, were but few, from which cause a great number left the fair unsold; indeed there has not been so heavy a market for bacon pigs for many years past. The price for pigs that required a little more feeding averaged from 5s. to 6s. per stone. Those ready to slaughter ranged from 6s. 6d to 7s. per stone.

BOSTON FAIR, LINCOLNSHIRE.—The fair was largely attended by eminent London horse-dealers, and many gentlemen were present who selected hunters for the completion of their studs. Young carriage horses met a good demand at prices ranging from 30 guineas to 35 guineas, and well matched pairs of young horses, unbroke to double harness, fetched 80 guineas to 90 guineas. Dark greys, or bright bays, sold as high as 120 guineas and 130 guineas the pair. Two-year-old colts made 20 guineas to 28 guineas. Of hunters the show was exceedingly good, although many were sold prior to the fair, and again offered. Hunters, well seasoned, and adapted to hunt on heavy lands, fetched from 80 guineas to 90 guineas, and 100 guineas each; and many Irish horses were sold to go to the northern counties. Brood mares and entire horses of good blood sold at very high prices, and were purchased for exportation. Cart-horses were of the best description, and fetched from 30 guineas to 40 guineas each.

BEVERLEY HORSE FAIR was well attended; hunters sold for 45, 90, and 190 guineas; carriage horses for 38 guineas, and well-matched pairs 100 guineas. Park and hack horses varied from 24 to 30 guineas.

BRADFORD CORN AND CATTLE MARKET.—The quantity of wheat pitched for sale was shorter than for several weeks past. Notwithstanding the short supply, the trade was extremely dull, and prices must generally be quoted 1s. to 2s. lower than on our last, several lots remaining unsold at the close of the day. A prime sample of Chiddam wheat, grown by Mr. Wm. Greenhill, of Farley Castle, obtained 34s. In barley the trade by no means so brisk as of late, whilst a reduction had to be submitted to even for the finest parcels, before sales could be effected. Old beans and oats sold rather more freely, but with prices unaltered. Several pens of fat sheep found customers early in the day, whilst in the beef market most was sold. Store pigs in abundance, and considerably cheaper.

BRECON FAIR.—The quantity of stock was abundant and in good condition. Cattle of every description met with a ready sale at good prices. Good cart horses were in great demand, and realized high prices. Skim cheese was sold for 4d. and 4½d. per pound; cream cheese for 8d. Butter (in the tub) was sold for 10½d. and 11d. per lb. On the second day, pigs fat and fit for the butcher were in great request, and sold well; stores were not much sought after, and those sold were disposed of at a very low rate.

BRIDGEND FAIR was not so numerously attended as usual, owing, no doubt, to the unfavourable state of the weather. There was notwithstanding a tolerably good supply of horned cattle, many of which sold at moderately fair prices. Some sellers however, expressed themselves dissatisfied.

CALLINGTON FAIR.—There was a tolerably good attendance both of buyers and sellers. Fat bullocks sold at from 50s. to 58s. per cwt.; cows and calves were scarce. Steers were much inquired for, and store bullocks sold freely at 40s. per cwt. There was not so large a number of sheep as at the last November fair, but they all found buyers at good prices.

CASTLE-DOUGLAS FAIR. — The number of horses in the fair was large; and it was also well attended by dealers. For good first-class draught horses the demand was very good, and at prices fully equal to those of last Roodmas. The demand for the second class and inferior horses was not so good, and particularly in the afternoon of the day; but, upon the whole, the fair was considered a very good one.

CAMBRIDGE FAIR was larger than it has been on previous occasions, especially of steers, of which there were an immense number; of sheep there were very few, not a hundred. The horses were of a wretched description, scarcely a good one in the fair. The principal business done was amongst the cow stock. The prices upon the whole were considered somewhat lower than those quoted in the fairs of late.

DODBROOKE MONTHLY CATTLE MARKET.—The supply of bullocks was small, whilst that of sheep was great and good; the demand was about an average, and the former were nearly all sold at prices fully as high as heretofore; whilst the latter moved off slowly, at receding prices, and one-third were driven out unsold. Best bullocks, 54s. to 58s.; contract, or second quality, 50s. to 54s.; grazing oxen and cows, 40s. to 45s.; rough steers, 35s. to 40s.; cows and calves, 56s. to 64s. per cwt. Wethers, 6½d. to 6¾d.; ewes, 6¼d. to 6½d. per lb.; wool, nominal price, 8¼d. to 8½d.

DONCASTER FAIR.—The show of cattle far exceeded what we have ever seen at the previous November fairs; nor was this deficient in quality, as numerous lots of very fine stock might be found exhibited for sale. The demand for lean cattle was only languid; sellers were unwilling to take lower rates, consequently not so much business was done. Sales could only be effected at a trifling reduction below previous rates. The show of fat was not so large, yet there was a supply of good quality, and prices varied from 6s. 6d. to 7s. 6d. per stone. In-calvers and cows with calves scarce, much in request, and good prices obtained. In sheep very little doing, and prices unaltered. For good horses a brisk demand: inferior sorts heavy of disposal.

DUMFRIES FAIR.—The number of horses shown was fully as great as we have yet seen at any of our Martinmas horse markets; and several stranger dealers were in attendance. The quality generally was, as usual, inferior to the Candlemas and Roodmas shows. The prices obtained were, according to quality, a little lower than those obtained at Roodmas.

HORSHAM FAIR.—The supply was short, which enhanced the prices of stock offered for sale. Good bullocks, grass fatted, made from 18*l.* to 20*l.* a head; store beasts fetched from 14*l.* to 16*l.* each; Sussex oxen, accustomed to the yoke, made from 16 to 18 guineas each. There were some large droves of Welsh cattle brought in, but the high prices asked for stock by the Welsh cattle dealers limited the business. Three-year-old bullocks were selected from the droves at prices of 12*l.* to 14*l.* a head, small beasts fetched 10*l.* to 12*l.* a head, and Welsh heifers made 9*l.* and 10*l.* each. Milch cows, well bred, were bought for dairying at 14*l.* to 15*l.* including a small calf. Good cart horses fetched from 25 to 30 guineas; and pigs sold at low prices.

AT KILMAURS FAIR, one of the most extensive in the west country for cows, there were a good many purchasers from England, and others commissioned to purchase for stock-holders over the Tweed. The cattle exposed for sale amounted to about 1000. The prices continued firm, and there was no tendency to a reduction. Stirks sold from 4*l.* to 6*l.* Two-year-olds sold quickly at from 8*l.* to 15*l.* One quay from Mauchline fair was bought at 15*l.*, and resold at 16*l.* Young cows, calving in April or May, sold at from 8*l.* to 15*l.* Mr. Kirkwood, of High Longmuir, sold a fine cow for 20*l.*, and also two stirks at 8*l.* each. Aged farrow cows sold at from 4*l.* to 8*l.*, one brought as high as 10*l.* Highland cows sold at 10s. per stone, sinking offal. The price of them may be quoted from 9*l.* to 10*l.*, but there were but a small number of them in the market.

KELSO MONTHLY CATTLE MARKET.—There was a small supply of fat and grazing cattle, and so little business was done that we are unable to quote prices. There were very few sheep shown, and nearly the whole were sold at 6½d. per lb.

LANREATH FAIR.—There was a small supply of bullocks, fat cattle fetching from 53s. to 56s. per cwt., and store cattle from 42s. to 45s. per cwt. The supply of sheep was large, fat sheep selling at 6d. per lb., and store sheep fetching from 30s. to 38s. There were several good cows and calves at the fair, but the sales for them were dull, and but little business was transacted.

LAUNCESTON FAIR was more numerously supplied with cattle, and those of a better description, than ever before recollected. There was also a good attendance of buyers, and the greatest part of the cattle changed hands; prices good, but not so extravagantly high as at some previous fairs. There was likewise a larger supply of sheep than usual, including a lot of Irish, which met with a fair sale.

LYNN FAIR was very well attended. There was a good show of short-horns, Devons, runts, and store beasts, with a few cows and calves. Very few Scots were in the fair; there not being room for them all, the business in them was done on the grazing grounds. Business on the whole was lively, and good prices were obtained. But few sheep were in the pens, and they were all disposed of.

LOUGHBOROUGH FAIR.—There was a large supply of fat and store cattle, and a great number of buyers in attendance. A good amount of business was done at good prices. The horse fair was also well attended, and a greater number than usual of good horses were shown.

NEWTON-STEWART FAIR.—There was a fair show of cattle. Although it was not quite such a selling market as last one, yet a good deal of business was done, and we do not know that prices can be quoted lower. There was an unusually large number of horses shown. For good heavy draught horses there was a good demand, and high prices were obtained. One brown horse brought £47, a bay mare £44, and several were sold from £35 to £40. Horses of an inferior description were more difficult to sell, and were offered at lower rates than they have been for the last six months.

PENRITH CATTLE FAIR, Nov, 20.—The weather was most unpropitious: the attendance was very thin; there was a tolerable supply of stock, but prices were very high. The sales were but very few.

ROMSEY FAIR.—There was rather a less quantity of cheese pitched than is usual, and the sale was less brisk than at the August fair. The prices were for Somerset and North Wilts, 50s. to 62s.; thick ditto and Cheddar, 45s. to 74s.; inferior ditto, 50s. to 54s. In the cattle market there was an average show, and an evident and general rise; sheep, especially ewes, fetched enormous prices, while cows and heifers were in great request, and realized heavy sums.

TAVISTOCK—Cattle may be quoted from 42s. to 52s. for fat steers and cows; sheep from 6d. to 6½d. per lb.; store pigs were numerous, and fetched from 3½d. to 4½d. per lb. Shambles—beef, 6d. to 6½d.; veal, 6d.; mutton, 5½d. to 6½d. per lb.: pork carcases, 5¼d. to 5½d. per lb.

TRURO FAIR.—There was a large supply of bullocks, many jobbers from the eastward being in attendance with cattle. Fat cattle fetched from 54s. to 56s. per cwt.; plough oxen and steers sold at very high prices, and half-fat cows and heifers fetched from 45s. to 48s. per cwt. The sheep fair was smaller than has been known for the last twenty years, partly attributable to St. Columb fair being on the same day. The sale for sheep was very good, fat sheep selling at rather more than 6d. per lb.

WELSH POOL FAIR.—There was a large supply of sheep, with but a small attendance of buyers, consequently prices rather declined, the top figure being 6d. to 6½d. per lb. Many lots remained unsold. Pigs were plentiful, and such as were sold went at a very low figure. There was a fair supply of good beef, and some very choice beasts fetched 6d. per lb.; but the chief part was sold at 5d. to 5½d. Good barrens sold well, and cows and calves were scarce and dear. There were but few good horses in the fair, which soon found purchasers, but a great lot of "old stagers" went back without an offer being made.

YEOVIL FAIR was well attended, and well supplied with stock; the number of sheep penned exceeded 3,000. Fat sheep found early buyers, but poor stock of all descriptions hung on hand. There was also a good show of beasts, of which the same may be said. Pigs were very short, and met no sale. The horse fair was of a rough description, with a very little doing.

IMPORTATIONS OF FOREIGN CORN INTO BELGIUM.—In consequence of the probable scarcity of corn and other grain throughout the Continent during the ensuing winter, the dealers and speculators are laying in their winter stock so as to guard against any such calamity in Belgium, and very extensive importations of wheat and corn have been entered at Ostend, Antwerp, and other ports (as well as by land carriage) free of duty from Russia, Sweden, Norway, Denmark, Prussia, and the Baltic, England, the United States of America, the Mediterranean, Egypt, Turkey, Odessa, &c. The following is an official return of the quantity imported.

	In 1845.	1st 9 months of 1846.	Total of 21 months.
	Kils.	Kils.	Kils.
Wheat	93,695,376	121,430,747	215,126,123*
Rye	19,644,035	48,375,136	68,019,174
Barley	36,429,637	19,118,466	55,541,103
Oats	5,660,254	2,676,559	8,336,813
Millet	2,341,508	2,245,176	4,586,684
Rice	11,023,757	9,415,124	20,438,881
Potatoes	26,255,880	22,543,355	48,799,235
Flour and other produce	14,874,102	19,629,528	34,503,630
Total	209,924,549	245,434,091	455,358,640

During the period of 21 months, from January, 1845, to 30th September, 1846, the importations have exceeded former years. Of the above total there have been 205,000,000 kilos. of wheat, 55,000,000 do. of barley, 49,000,000 do. rye, and 48,000,000 do. of potatoes, entered for home consumption. During the last month the importations of grain of every description have been very great, and large contracts have been entered into for further supplies. The Belgian government has entirely prohibited the exportation of wheat, corn, and grain of every description; flour, potatoes, &c.

AGRICULTURAL QUERIES.

GAS LIME-WATER.

TO THE EDITOR OF THE MARK LANE EXPRESS.

Sir,—I shall feel obliged to any of your practical readers to favour me with an answer to the queries as under:—

1. In what proportion to dilute gas lime-water, and by what means to apply it?
2. When to apply it, and in what quantity?
3. To what purposes it may be applied with the most advantage?

Any further useful suggestions will oblige, Sir, yours respectfully, Utilitarian.

Sir,—I will feel obliged if any of your readers who have used guano as a manure for potatoes, will inform me, through the medium of your paper, whether they consider it preferable to place it *above* or *below* the potato? I am, sir, yours respectfully,

Oct. 31. R. G.

Sir,—Would you or any of your numerous correspondents, be kind enough to inform me, through the medium of your paper, the best time for breaking up an old meadow to sow with oats in the spring? Also another meadow to sow with lucerne, and if it would answer?

Yours truly,

A Young Farmer and Constant Subscriber.

Oct. 28.

Sir,—I have been informed that in the north of England they have a better process of peeling oak-bark, and preparing the same, than we have in the south. Would any of your correspondents oblige me, through the medium of your paper, with the northern peculiarity alluded to?

I am, Mr. Editor, yours truly,

Nov. 5. Old Subscriber.

A Correspondent would be obliged by answers to "Where are the best hand or horse-mills for grinding wheat to be had? What is the cost? Are they likely to get out of repair? And whether they have French burr-stones attached?"

Sir,—I have just noticed in the *Mark Lane Express* a report of the proceedings of the London Farmers' Club, wherein Mr. Morton (I suppose, of Whitfield Farm) speaks of cutting up his straw as it comes from the thrashing machine. Will Mr. Morton have the goodness to inform the farming public, through your columns, how he makes use of his cut straw, whether for fodder or litter? and if the latter, whether he finds

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[*] 100 kilogrammes is equal to 1 cwt. 3 qrs. 24 lbs. 7¾ ounces, nearly.

the cut straw much more economical and generally useful than the straw uncut? and what length it is cut?

Should it happen that Mr. Morton does not use his cut straw as litter, I believe any practical man who may see this letter, and who is in the habit of using cut litter, will confer a great obligation on the community by giving us a detail of his practice.

I am, sir, yours obediently,

Nov. 11. CESTRIAN.

ANSWERS TO AGRICULTURAL QUERIES.

TO THE EDITOR OF THE MARK LANE EXPRESS.

"IS SALT USEFUL IN FATTENING, AND OTHER STOCK?"

SIR,—In reply to "Isaac's" query I find that Parkes states, "horses are very fond of salt, and cows give more milk when supplied with it." Dr. Mitchell states, that "in the back settlements of America, wherever salt abounds, thither the wild beast of the forests assemble to regale themselves, and some of those places are so much frequented that the ground is trodden to mud by them; and sheep and cattle resort to the clay salt pits in such numbers, that some of them are frequently overpowered and trodden to death." That salt was used in ancient times is evident from the following quotation from Virgil's pastorals by Dryden:—

> "If milk be thy design, with plenteous hand
> Bring clover grass; and from the marshy land
> Salt herbage for the foddering racks provide,
> To fill their bags and swell their milky tide;
> To raise their thirst and to the taste restore
> The savour of the salt, on which they fed before."

I am yours &c.,

A READER OF "SOUTHEY'S TREATISE ON SHEEP," AND YOUR EXCELLENT PAPER.

"IS SALT USEFUL IN FATTENING STOCK?"

SIR,—Under the head "Agricultural Queries" in your last paper, is the question as above by your correspondent "Isaac."

Inasmuch as healthy animals feed better than unhealthy animals, salt is not only useful but essential to economical feeding.

I doubt if an instance could be found of an animal having been injured by eating salt, *when left to take only so much as nature requires*; but if man interferes too much, and mixes salt with their food according to *his* notion of what the animal *should* consume, or if brine be administered by drenching, injury may ensue.

All cattle and sheep, whether feeding or stores, or milking cows, should have free access to lumps of salt placed in mangers or other dry places, and they will take just as much and no more than *nature requires*, and I believe that stock so treated would be free from epidemic, and that sheep would be effectually preserved from the rot.*

Salt is not to be considered as an article of food, but as a condiment absolutely essential to animal existence; and if what nature requires of this article is not to be had *in some form or another*, impurity of the blood and disease of the animal will follow.

October 24th. JACOB.

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* On the low lands in Holland salt is consider ntial for the preservation of sheep stock from the rot.

DUTY ON HOPS.

An Account of the Duty on Hops of the growth of the year 1846, distinguishing the districts, and the old from the new duty.

Districts.	Duty.			
Barnstaple	£268	16	7¼	
Bedford	0	14	10½	
Cambridge	28	0	8¼	
Canterbury	82,857	11	7½	
Cornwall	10	1	5	
Derby	613	19	5½	
Essex	1,201	5	1	
Gloucester	124	0	5	
Grantham	245	15	11	
Hants	18,920	8	4¼	
Hertford (charged £50,926 9s. 3d., estimated* £570)	51,496	9	3	
Hereford	237	3	10¾	
Isle of Wight	9,295	12	5	
Lincoln	3,670	13	4½	
Lynn	52	14	0¼	
Oxford	60	16	9¼	
Reading	63	9	5¼	
Rochester	134,380	19	0¼	
Salisbury	104	16	6¾	
Salop	14	4	4½	
Stourbridge	2,956	18	7½	
Suffolk	1,402	4	10¼	
Surrey	20	9	11	
Sussex	124,147	1	7¼	
Wales, Middle	134	1	2	
Worcester	11,301	7	4½	
	£443,609	17	1¼	
Old duty, at 1 12-20d. per lb.	242,929	15	7¼	8-20
New duty, at ¾ 8-20d.	179,556	15	10½	12-20
Additional duty of 5 per cent., by Act 3 Vict., c. 17	21,123	5	7¼	
	£443,609	17	1¼	

* This estimate arises from Mr. Vevers, a planter in this district, having declined to complete the weighing of his hops.

L. S. LYNE, Accountant General.

Excise-office, London, 6th Nov., 1846.

NOTICE TO CORRESPONDENTS.

"WARWICK."—The best time for pruning your trees is when they are in full leaf, as they never bleed then.

"W. Y."—The finest flavoured butter is obtained from milk churned not long after it is drawn; but the largest proportion is derived from cream thrown up by the milk after standing 24 hours in a temperature of about 50° F.

"ENQUIRER."—Caoutchouc is obtained from a species of fig-tree called *ficus elastica,* which grows at Assam, Singapore, and in South America. It is produced by making incisions, about 12 inches from each other, in the bark of the tree, in the cold season, when a white creamy substance exudes; each bleeding of the tree will produce about 42lbs. weight, and this is repeated once a fortnight during the season.

REVIEW OF THE CORN TRADE

DURING THE MONTH OF NOVEMBER.

The weather has throughout the month been as auspicious for out-door work as could possibly be desired; and rapid progress has been made with wheat sowing. In consequence of the favourable state of the weather, the preparation of the soil for the reception of the seed has scarcely met with a single interruption; and a larger breadth of land has already been sown than is usual at this period of the year. The satisfactory manner in which the work has hitherto progressed, together with the present remunerating price of wheat, will probably have the effect of extending its cultivation; and we are inclined to think that a greater breadth of land will be put under this crop than in ordinary seasons. The close attention which farmers have been induced to bestow on field operations have allowed them very little leisure for other descriptions of work; hence comparatively little grain has been thrashed out during the last few weeks, and the markets in the agricultural districts have been sparingly supplied. This will probably continue to be the case for some weeks longer; but previous to Christmas we may calculate on larger deliveries from the growers. Notwithstanding the trifling nature of the supplies, the trade has been very quiet during the month. The inclination to enter into speculative investments had already, in a great measure, subsided at the close of October; and subsequently the merchants and millers began to contract their operations under the conviction that the extent of the potato disease had been a good deal overrated. Our readers will recollect that we have all along questioned the accuracy of the reports which represented potatoes as a total failure; our estimate of the loss having at no period been so great as that of the generality of the writers on agricultural matters. When the excitement occasioned by the discovery of the re-appearance of last year's disorder was at its highest pitch, and when positive assertions were being put forth by the daily and weekly papers representing the crop to have totally failed, we expressed our belief that at least one half would be saved; and we have now reason to conclude that our estimate was rather under than over the mark. The early varieties appear to have suffered much more severely than the late kinds; and most of the potatoes recently dug have turned out far better than was expected. In proportion as this fact became known, so did the disposition to buy wheat diminish; and the falling off in the demand became so decided as to cause a gradual but steady reaction in prices, the total fall during the first three weeks in November having amounted to about 4s. per qr. Latterly a slight reaction has occurred; still the trade has not recovered from the depression, and a great difference of opinion exists as to the probable future range of prices. Under these circumstances, it may, perhaps, be useful to enter into as close an investigation of the actual position of affairs as the absence of statistical information will admit of. It is scarcely necessary to say that absolute certainty in regard either to the produce of the last harvest, or the amount of old corn of home growth remaining in the country at the time the new crops were gathered, cannot be arrived at. Something like an approach to the truth may, however, by careful inquiry, be gained. We have spared no pains to collect information from the best sources at our command; and all we have learned confirms the impression we formed at the period of harvest, viz., that the yield of wheat was scarcely equal to that of average seasons, taking the United Kingdom collectively.

We feel equally well satisfied that spring corn and pulse of every description suffered too severely from the scorching heat during the summer, to afford anything like an average produce. The deficiency in both barley and oats would, we think, if it were possible to measure it accurately, be found to be nearly a fourth, and that of beans and peas something like one half. Allowing, then, that the ill effects of the potato disease have been greatly exaggerated, still we can arrive at no other conclusion than that the total production of food in the British islands has fallen lamentably short in the year 1846.

We have next to consider what stocks there were on hand at the time of harvest. The bare appearance of the stack-yards in July and August, and the comparatively small proportion of old grain brought forward shortly after the harvest was completed, afford strong presumptive evidence to prove that the stocks of old were nearly exhausted when the new was gathered; and we think this would have been fully demonstrated, if the harvest had not been at least three weeks earlier than usual. Last year a large portion of the supplies brought forward by the farmers consisted of old wheat till nearly up to Christmas, whereas this season hardly a sample has appeared for months past. What inference must be drawn from these facts? To us they appear clearly to indicate that the quantity of home-grown wheat is much smaller at the present time than in usual years, and that a considerable importation of foreign corn will not have the effect of causing any material decline in prices. The quantity of wheat and flour which has paid duty since the present laws have been in force has, it is true, been enormous; viz., 1,845,365 qrs. of the former, and 2,865,968 cwts. of the latter article; but, in consequence of the immense consumption of bread which has been going on, our granaries, which a few months ago were filled to repletion, have already become comparatively empty. The question, therefore, is, Will the expected arrivals from abroad be of such magnitude as to counteract the effects of a short produce at home? In regard to the probable extent of the foreign importations, we shall enter more at length into the subject at the close of this article; but our impression is, that for some months, at least, the receipts are not likely to be so large as to produce much effect on the value of grain in this country.

We shall now proceed to give a somewhat more detailed account of the changes which have occurred in the trade than is afforded by the foregoing remarks. The variations which have taken place at Mark Lane having been closely followed at the other principal markets, we shall confine ourselves to the occurrences at the first-named place. Up to the close of October the supplies of English wheat into London were unusually large; but since then they have been of the most scanty character. The town millers having, however, got well into stock previously, and the falling off in the speculative demand already referred to above having caused a certain degree of languor, prices began early in the month to retrograde. With quite a moderate show of wheat by land-carriage samples from the home counties, factors found it absolutely necessary to give way 1s. to 2s. per qr. to make sales on the 2nd inst. This concession was not followed by any improvement in the demand; indeed, the inquiry became more and more languid, and on the succeeding Monday a further abatement of 2s. per qr. took place. At this point a stand was made, and for some time prices remained nearly stationary; but about the middle of the month the millers began to buy a little more freely, and on the 23rd purchases could not be made at such easy terms as before, about 1s. per qr. of the depression noticed being then recovered. Since then the tendency has, on the whole, been upwards, though the market is not, we think, in such a position as to be able to stand a heavy supply. Of the wheat sold during the last few weeks a considerable proportion has been taken for shipment to the north of England; the local millers having confined their operations to as narrow a compass as has been consistent with their pressing wants.

The transactions in free foreign wheat have not been on an extensive scale; still the deliveries from the granaries have been rather important, and we doubt whether more than 300,000 qrs. are now left at this port. Besides what has been taken for local consumption, buyers have, from time to time, visited us from different parts of the country, and some rather large purchases of the lower qualities have also been made for shipment to Ireland. The prices paid have been from 2s. to 4s. per qr. below those current in October. The lowest period was between the 9th and 16th; since the latter date holders have exhibited increased firmness, and there is certainly no appearance at present of any further giving way. Bonded wheat has met with a good deal of attention for shipment to France, and several cargoes have been taken for that country at prices scarcely 2s. per qr. below those at which similar descriptions might have been bought free. Should the export demand continue, importers will of course prefer selling to French buyers rather than pay the 4s. duty; the rates hitherto paid by our continental neighbours having, as already remarked, been within 1s. to 2s. per qr. of the free value. The arrivals of wheat from abroad have been only moderate; still they have exceeded the quantity exported, and the stocks under lock have rather increased. On the 5th Nov., the latest period to which the official returns are made up, there were 114,989 qrs. in the kingdom, of which there were 36,879 qrs. at the port of London.

The top price of town-manufactured flour was put down in the beginning of the month from 60s. (at which it had stood for some time previously) to 56s. per sack; and a fall of 3s. to 4s. per sack took place about the same period in the value of country flour. The metropolitan bakers have, nevertheless, bought very sparingly; which may be accounted for by the large forward sales made by the millers in October. These contracts have, however, now been pretty nearly fulfilled; and we are disposed to think that the demand for flour will improve. American barrelled flour has maintained its previously high character. This description is much liked by our bakers, and the quantity taken has been rather considerable. The best brands have not at any period been sold below 33s. per barrel, duty paid; and recently many of the holders have declined selling under 34s. A few speculative purchases of the article have likewise been made in bond, at rates corresponding with those paid for free. The quantity under lock in the kingdom consisted, on the 5th Nov., of 257,985 cwts., of which there were 32,129 cwts. in London.

The arrivals of English barley have been small for the season of the year; but the extravagantly high prices paid last month have not been maintained. The top quotation at Mark Lane does not now exceed 50s. per qr.; which shows a fall of 4s. to 5s. per qr. from the extreme rates obtained in October. Secondary sorts have declined in the same proportion; but good fresh grinding qualities have given way very little, being still worth from 36s. to 38s. per qr. Rather liberal supplies of this grain have reached us from the continent, and further receipts to some extent may be expected before frost puts a stop to the shipments from the north of Europe. We had in bond, on the 5th inst., at this port, 3,047 qrs., and in the United Kingdom 15,895 qrs. The reaction which the value of barley has undergone has had more or less effect on prices of malt; but the fall in the latter has not been so great as in the former article. The brewers are evidently very indifferently stocked; and though they have acted with the utmost circumspection, their wants have been too pressing to allow them to keep out of the market, and we do not see much prospect of malt being cheaper.

Although rather large supplies of oats have been received from the near continental ports during the month, the arrivals from our own coast, Scotland, and Ireland, have been so trifling as to cause the total supply to fall materially short of the consumption. The decrease in the receipts from Ireland has been very great; and we have, for years past, been so accustomed to depend on that country for the bulk of the oats consumed in London, that it may well be doubted whether we shall be able to import a sufficient quantity from foreign countries to compensate for the falling off in the arrivals from the sister-isle. The future range of prices will therefore mainly depend on the extent of Irish receipts: if these do not greatly increase, a further advance is almost certain. In the early part of the month some effect was produced on the market by the arrivals from abroad, and a temporary decline of 1s. per qr. took place in quotations; latterly, however, this depression has been recovered, and prices are now much the same as they were at the close of October. At that period our principal dealers were, however, tolerably well stocked, which is not the case at present; and, on the whole, there is more appearance of a rise than a fall in the value of this grain. Of the foreign which have come to hand, the greater proportion have paid duty from on board ship, and has been bought for immediate use; and the quantity in bond on the 5th inst. was only 38,104 qrs. in London, and 52,621 qrs. in the United Kingdom.

The absence of severe cold has occasioned beans to be less extensively used than is usually the case in the month of November; and though the English supply brought forward has been only moderate, the value of the article has tended downwards, being at present 1s. to 2s. per qr. lower than about this period last month. Egyptian beans have not given way in price. The quantity received has been comparatively small; and though the demand has been of a retail character, previous rates have been about supported.

In our last number we took occasion to remark that rather large arrivals of foreign peas might be reckoned on, and that we consequently doubted whether the high value of that article could be maintained. Our opinion on the subject has proved correct: in one week, upwards of 12,000 qrs. of white peas were received at the port of London, and since then prices have gradually receded, good foreign boilers being now obtainable at 50s., and fine English at 52s. to 54s. per qr.—a decline of 4s. to 5s. per qr. on former rates. Maple and grey peas of home growth have come sparingly to hand, and have commanded very full terms.

Indian corn, which has of late become an important article, claims a word or two of notice before we close our remarks on the home trade, and commence the review of the foreign markets. In England, the description of food last named has not hitherto gained much favour; but in Ireland it appears to be now highly esteemed. The business has therefore been principally confined to cargoes to arrive, which have been readily taken by Irish buyers. At one period, as much as 56s. to 58s. per qr. was paid for fine heavy qualities: subsequently a fall of several shillings per qr. took place; and though a portion of the decline has recently been recovered, still purchases may yet be made fully 4s. per qr. below the rates named. The transactions in this article have been far more important in the Liverpool than in the London market.

We have now come to that part of our review which we propose to devote to the consideration of the position of the corn trade in foreign countries. Hitherto the north of Europe has generally been the quarter from which Great Britain has drawn her foreign supplies; but the new order of things is likely to make a great alteration in this respect, and America now claims priority in our remarks. That the capabilities of the United States and Canada to produce grain are immense is admitted on all hands; and at no very distant period the extent of the supplies from the other side of the Atlantic is likely to have no inconsiderable influence on prices at home. At the same time, we are inclined to think that the probable extent of the shipments from that quarter previous to the setting in of winter, and the consequent stoppage of the canal navigation, has been greatly over-rated. The stocks of flour and corn at most of the shipping ports had, according to the most recent advices from America, been reduced into a comparatively narrow compass; and as supplies from the interior could only be brought by water carriage—a means of conveyance usually stopped by frost at the end of November—no further exports of importance could, it was deemed, be made till the spring.

New York is the port from whence the great bulk of the flour received here is usually shipped. On the 1st Nov. the stock at that port was estimated at a little over 100,000 brls.; and it was the prevailing opinion that after that still expected from the West should have come to hand, and the engagements to ship which had been entered into had been fulfilled, there would not be more left on hand than the quantity named.

The consumption of New York is, we believe, about 5,000 brls. per week, and some apprehension was therefore entertained that scarcely sufficient might be left on hand to provide for the use of the city; indeed, we have seen a communication from New York, stating that it might perhaps become necessary to re-import. Under these circumstances it is not surprising that the value of the article should have risen considerably, and as the price was then six dollars per brl., which with freight and insurance would make the cost here above what the article may be bought at in the Liverpool and London markets, our merchants will hardly send out orders at such limits.

The shipments from New York from 1st January to 27th October, had amounted to 817,229 brls. had been exported. It must be borne in mind, however, that a large proportion of these shipments had been for the West India islands, Newfoundland, and the Brazils, and that the greater portion of that destined for England has long ere this reached our shores, and been consumed. A few hundred thousand brls. may perhaps yet reach us during the winter; but to talk of millions, in the way that has been done of late by a portion of the press, is absurd.

We have refrained from saying anything relative to Indian corn, simply from this reason—that the returns of the stocks and exports are not so clearly given in the American official lists as those of flour. The great impediment to obtaining important supplies of this article till spring appears to be the unfitness of the new produce to stand so long a voyage until some months after it has been harvested. That there is an abundance for the purpose, if it were in a condition to be shipped, and could be got down in time from the interior, is generally admitted.

All the accounts from the Baltic agree in stating that the stocks of old wheat in that quarter are unusually low: Danzig is almost the only port at which any quantity of wheat is ready for immediate shipment, and even there scarcely 100,000 qrs. are held, a large proportion of which consists of inferior quality, not suitable for the English markets.

Until recently the want of vessels presented a great obstacle to shipments; but by the last advices we learn that a good many vessels had arrived there, which had caused a fall in freights of about 1s. per qr. The dull English reports had also produced some effect on quotations, and fine high-mixed qualities, which had previously been held at 58s. to 59s., had been sold at 55s. to 56s. per qr. free on board. Under these circumstances, a few orders received from Great Britain had been executed, and rather more activity had prevailed in the trade. In the month of October, rather over 2,000 lasts had been shipped to Great Britain, and the exports in November will probably exceed that quantity, but are not likely to be by any means large.

At the Lower Baltic ports scarcely anything seems to have been done in wheat for shipment, in consequence of the total exhaustion of the old stocks and the extreme insignificance of the supplies of new brought forward by the farmers.

Letters from Stettin state that the deliveries of wheat from the growers had hardly sufficed for the local consumption, and that what had come to hand had been readily sold for city use, at prices equal to 51s. to 52s. per qr. free on board.

The quality of this year's growth is described as greatly inferior to that of 1845, and the weight of the few parcels received from the interior had averaged only 58 to 59lbs. per bushel. Of barley the supplies had not been much more abundant than of wheat, and the brewers had taken off nearly the whole of what had come to hand. Pomeranian had sold at equal to 32s., and Oderbruch at 33s. per qr. Merchants were, however, willing to enter into contracts to ship good barley in spring at 30s. per qr. free on board.

From Rostock the accounts are wholly without interest, the want of stocks of grain having prevented any business being done there for exportation.

By the latest advices from Hamburg we learn that several purchases of wheat had been made there for shipment to France, and buyers from that country having paid higher prices than were permitted by the English orders, they had secured the little surplus remaining after the local wants of the place had been supplied.

In the early part of the month a good deal of barley was bought at Hamburg, for shipment to this country, and extravagantly high rates were given: the fall which the value of the article has lately undergone in the English markets has, however, caused a reaction, and by the latest accounts it appears that Saale barley was obtainable at Hamburg at 36s. to 38s., and that there were offers to ship at Danish ports at 28s. to 30s. per qr. free on board.

From Holland and Belgium we cannot expect to receive imports of grain; nor, on the other hand, does it appear likely that these countries will draw supplies from hence, for though prices are rather higher there than with us, they are not so high as to allow of shipping charges to be added.

In France wheat is still higher than in any other country in Europe, and we have lately had buyers from thence in several of our markets, including Mark-Lane.

A letter from Marseilles, of a very recent date, informs us that though 300,000 qrs. of wheat had in the course of a few weeks been received there, this immense supply had had no permanent effect on prices. A temporary fall of a few francs had been almost immediately recovered, owing to a continued and very extensive demand from the interior: equal to 50s. to 51s. per qr. had been currently paid for fine Polish Odessa; and whilst such prices are obtainable there, there is not much probability of supplies of wheat reaching England from any of the countries lying east of the Straits of Gibraltar.

CURRENCY PER IMPERIAL MEASURE.

November 23.

Wheat, Essex and Kent, new, red	63	66	White ...	60 67	70
Old, red	65	69	Do	66	70
Rye, old	34	36	New	36	38
Barley, Grinding 36 40 Malting	44	50	Chevalier	51	53
Irish	—	—	Bere	—	—
Malt, Suffolk and Norfolk	70	74	Brown	70	—
Kingston and Ware	70	74	Chevalier	70	74
Oats, Yorksh. & Lincolnsh., feed	27	30	Potato	32	—
Youghall and Cork, black	25	26	Cork, white	26	30
Dublin	25	28	Westport	23	—
Waterford, white	26	28	Black	24	26
Newry	30	32	Galway	23	26
Scotch, feed	28	30	Potato	30	32
Clonmel	30	32	Limerick	32	34
Beans, Tick, new	40	44	Old, small	48	52
Londonderry	28	30	Sligo	27	28
Peas, Grey	46	—	Maple	46	—
White	—	—	Boilers	50	52

Flour, Town-made 51 56 Suffolk 48 per sack of 280 lbs.
Stockton and Norfolk 40 48 Irish —

COMPARATIVE PRICES OF GRAIN.

WEEKLY AVERAGES by the Imp. Quarter, from the Gazette, of Friday last, November 20th, 1846.	s.	d.	AVERAGES from the corresponding Gazette in the last year, Friday, November 21st, 1845.	s.	d.
Wheat	61	5	Wheat	58	6
Barley	44	6	Barley	35	0
Oats	26	9	Oats	26	3
Rye	42	4	Rye	38	2
Beans	46	10	Beans	44	5
Peas	50	10	Peas	45	5

IMPERIAL AVERAGES.

Week ending	Wheat.	Barley.	Oats.	Rye.	Beans.	Peas.
Oct. 10th	56 10	37 2	24 7	35 9	43 7	46 7
17th	59 10	38 8	25 8	38 3	45 5	47 3
24th	60 10	40 2	26 6	39 0	45 9	43 10
31st	61 9	41 8	27 0	41 1	46 1	50 8
Nov. 7th	62 3	44 3	27 3	41 5	46 6	50 11
14th	61 5	44 6	26 9	42 4	46 10	50 10
Aggregate average of the six weeks which regulates the duty.	60 6	41 1	26 3	39 8	45 8	49 2
Duties payable in London till Wednesday next inclusive, and at the Outports till the arrival of the mail of that day from London	4 0	2 0	1 6	2 0	2 0	2 0
Do. on grain from British possessions out of Europe	1 0	1 0	1 0	1 0	1 0	1 0

PRICES OF SEEDS.

November 23.

Rapeseed, 22*l.* 24*l.* Irish, —*l.* —*l.*
Linseed, Baltic, 44 48 Odessa, 45 48
Mustard, per bush., white 8 10 brown, 9 10
Linseed Cakes, English 13*l.* 13*l.* 10s. per 1000
Linseed, English, sowing 50 60 crushing 41 48 per cwt.
Carraway, 41 43 new, 42 44 Coriander, 10 13
Hempseed, 35 38 per qr. Trefoil, 17 19
Canary, 55 58 fine, 60 62 Tares, winter, 6s. 0d.

HOP MARKETS.

BOROUGH, Monday, Nov. 23.

Prices remain stationery, at our last quotations. There has been some demand for Sussex, while the other kinds are neglected.

Farnhams,	105s. to 136s.
Country,	100s. to 120s.
Mid. Kent,	90s. to 110s.
Wealds,	80s. to 90s.
Essex,	90s. to 126s.
Sussex,	76s. to 82s.
Worcester, low,	63s. to 70s.
Do. general class,	75s. to 88s.
Do. very choice,	90s. to 92s.

POTATO MARKET.

SOUTHWARK WATERSIDE, Nov. 23, 1846.

The supply continues to be moderate coastwise from Kent and Essex, Yorkshire, Cambridgeshire, and by the railways from the various inland counties.

	s. s.		s. s.
York Regents	120 to 180	Kent and Essex Regents	140 to 180
Shaws	100 to 130	Ditto Shaws	120
Cambridgsh. Regents	120 to 140	Ditto Kidneys	140
Shaws	110 to 120	French Whites	80 to 110
Kidneys	100 to 130		

A TABLE SHOWING THE PRICES OF POTATOES LAST YEAR AS COMPARED WITH THIS.

	Nov. 24, 1845.		Nov. 23, 1846.
York Reds	£0 5 to £5 0	per ton.	£5 0 to £6 10
York Regents	3 0 to 6 0	,,	5 0 to 8 0
Sundries	0 10 to 4 0	,,	4 0 to 6 0

POTATO MARKET.—Liverpool.—Kemps, 5s. 4d. to 5s. 10d.; cups, 5s.; short tops, 3s. 10d. to 4s. 6d.; cattle, 2s. to 2s. 2d.; pink-eyes, 5s. 4s. to 5s. 9d. per measure of 90 lb. Sheffield.—Potatoes continue to be very limited, yet the sales are languid, as the high prices so much decrease the consumption. Regents, 11s. 6d. to 12s. 6d.; Shaws, 8s. 6d. to 10s. 6d.; short-top reds, 9s. to 10s. 6d. per load of 17 st. 2 lb.

END OF VOLUME XXV.

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